AMSTRAD COMPUTER USER

SEPTEMBER 1989
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THE OFFICIAL AMSTRAD CPC MAGAZINE



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SIMULATIONS
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GAMEPLAN
MORE FUN AND GAMES. THIS MONTH RICK DANGEROUS, NINJA COMMANDO, SILKWORM, TIMES OF LORE, SUPER SCRAMBLE AND MANY MORE!

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ARKANOID REVENGE OF DOH
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YOUR SINCLAIR – "Immensely impressive and chronically addictive. A Classic."

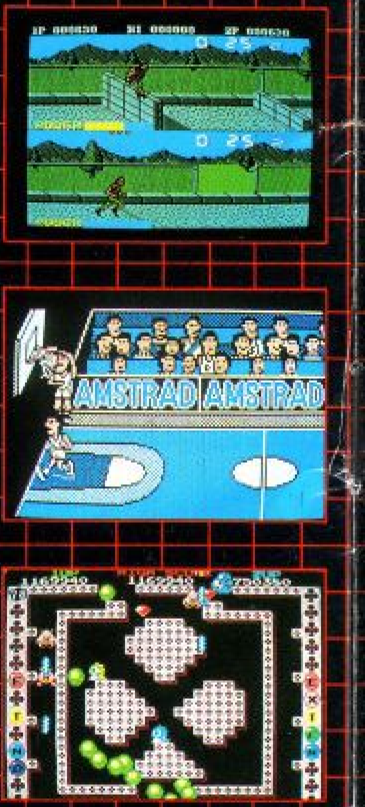
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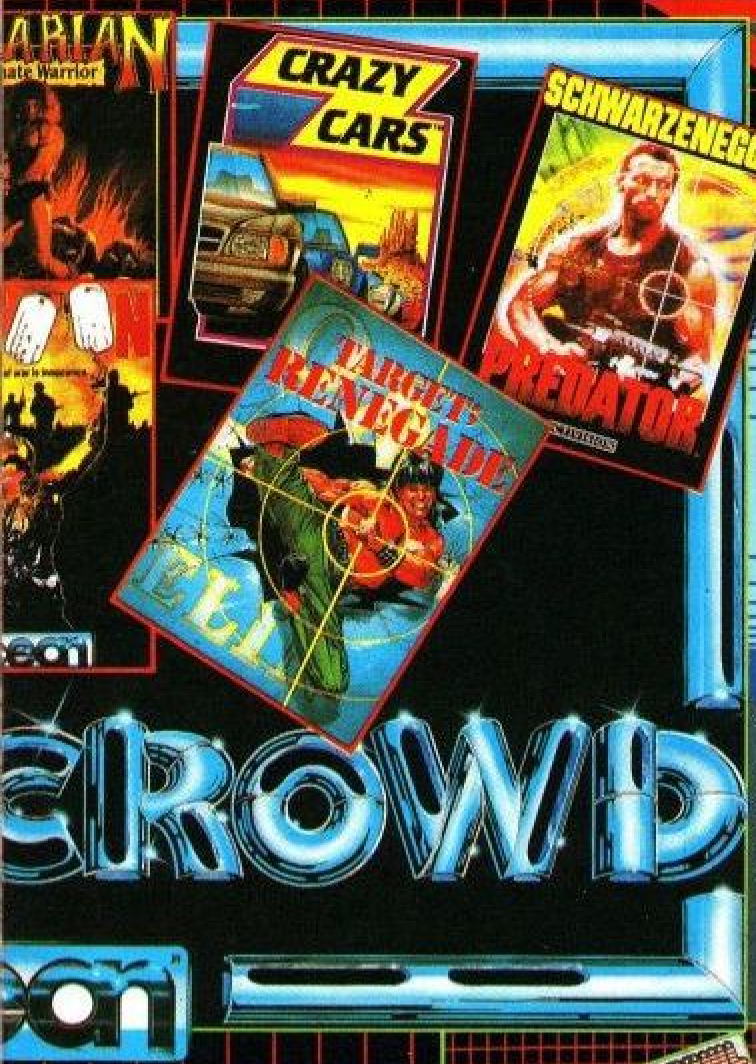


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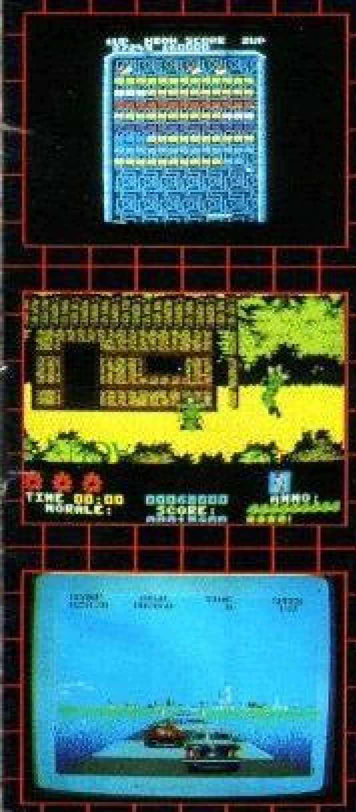
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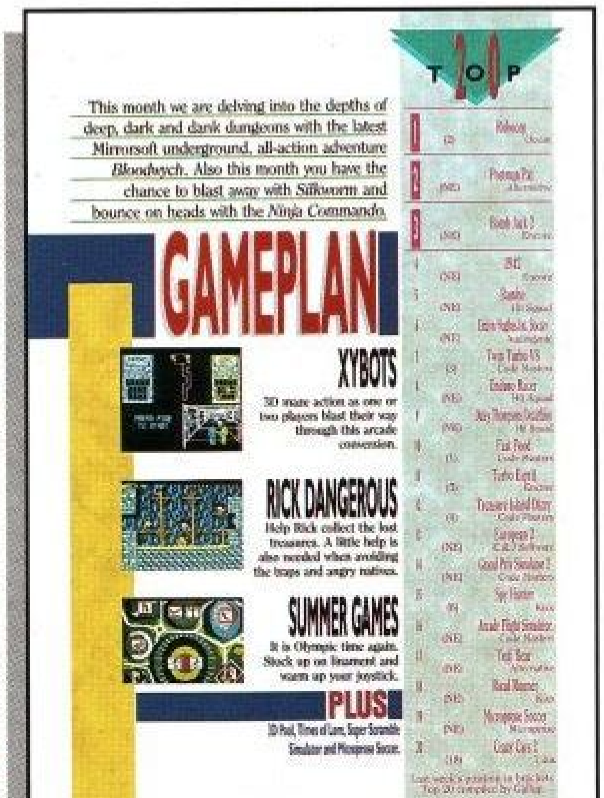
The secrets of the Bloodstone.

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Lee Paddon takes a look at the mean machine lurking in your Amstrad.

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Kenn Garroch lifts the lid of Pandora's box.



LETTERS

Missing

I was pleased to see David Dorn's modification for the expansion port on the 464 as I have been experiencing the troubles to which you refer regarding the I/F for the DDI. I read it all most avidly, thinking at last it was the probable answer to my problems, until I came to the tricky bit you said that you had added a sketch for clarification purposes, but there was no sketch.

I am hoping you will add the sketch in the next issue, as I think it would be wise to wait for it.

David Mitchell
Clacton-on-Sea
Essex

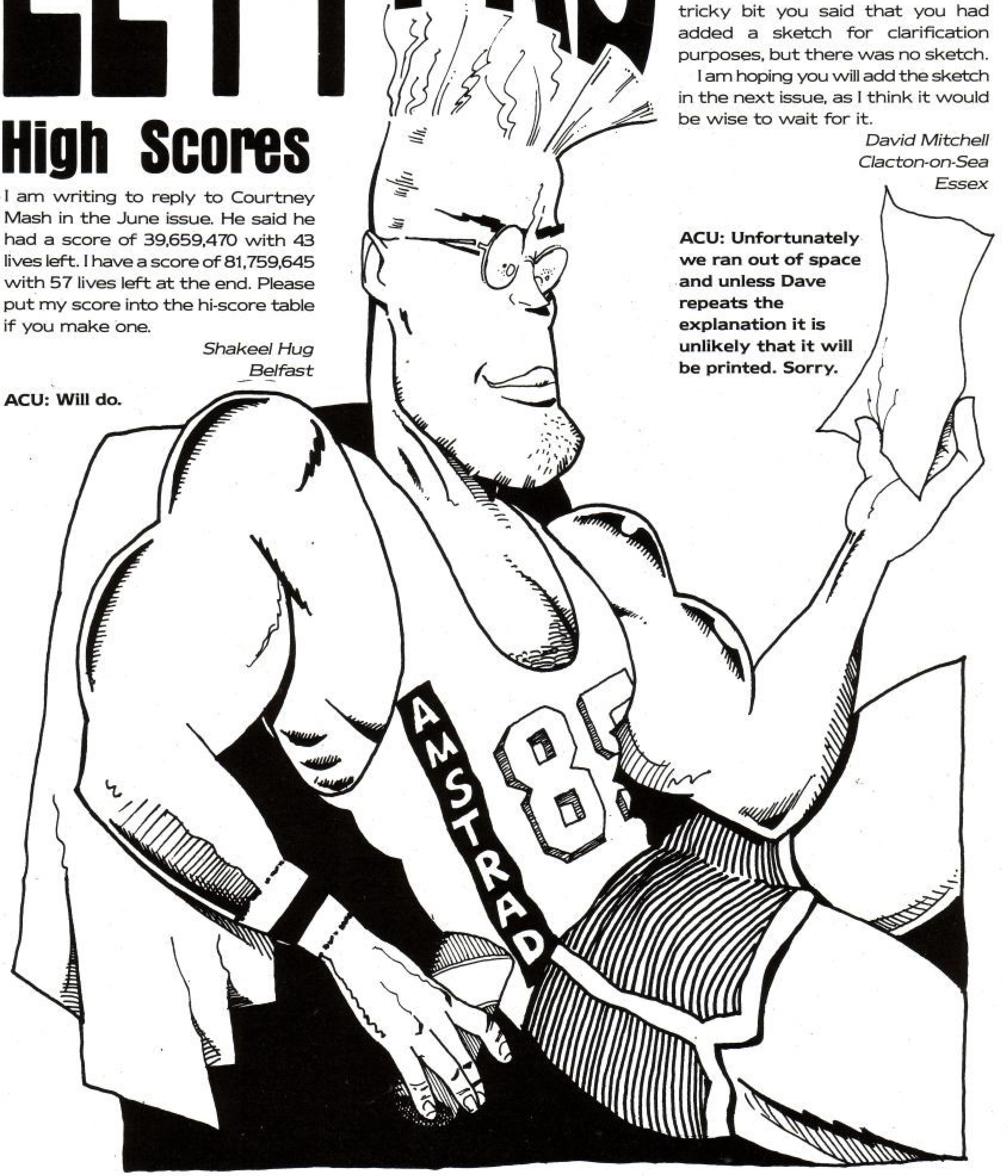
ACU: Unfortunately we ran out of space and unless Dave repeats the explanation it is unlikely that it will be printed. Sorry.

High Scores

I am writing to reply to Courtney Mash in the June issue. He said he had a score of 39,659,470 with 43 lives left. I have a score of 81,759,645 with 57 lives left at the end. Please put my score into the hi-score table if you make one.

Shakeel Hug
Belfast

ACU: Will do.



A line in time

I have been endeavouring to get the little routine, listed on page 7 of the July issue associated with the Type it Yourself article, to operate so as to produce the columns of figures as given. I think, however, that there are one or two misprints in the listing, namely:

1 The '1510' in the first line should read '10'
2 The '13' in line 50 of the upper block of output should read '11'
3 The '13' in line 70 of the same block of output should read '12'

I list the revised program and the output obtained from it.

A.M. Drake,
Newcastle-upon-Tyne.

CPC Blues

It will be little consolation to Bruce Savage but he is not alone. When I read his letter in the June, 1989 edition the events he described sounded very familiar. My CPC6128 also began life as the centre of attraction at Christmas, only to become the dreaded New Year nightmare.

I, too, suffered some problems with loading, as well as some even more distressing problems with saving. On returning my CPC to the shop I was told that it would be sent to Amstrad to be repaired. I have not seen it since. After months of waiting, two fruitless telephone calls and several visits to the shop, it seems Amstrad is out of stock of disc drives.

So I am still waiting. How many others, I wonder, are still waiting but what can we do? Once again, consumers are at the mercy of the stock market giant. The likes of Savage and myself, therefore, look to our *ACU* for support by providing us with the help and information we need to relieve some of our frustration.

The comment following Savage's impassioned plea was, I suspect, not so helpful as he had hoped. Having had a similar experience and, given the serious nature of the problem, I looked forward to your response with eager anticipation. Perhaps I expected too much but I was a little disappointed.

The ultimate return of our CPCs is probably beyond the influence of the ACU magazine but I am sure more could be done on our behalf and I wonder whether the proper people will necessarily see Savage's letter.

D.G. Foster
Southampton

ACU: You're probably right but we will try anyway.

Lost in space

Could you do me a favour? Look round "the office" and see if you can find any of my letters. The last one to be printed was "Exolon" in the February, 1989 issue of ACU and, since then, nothing. I have read about missing deadlines for the "Haunt", but four months?

I am beginning to wonder if (a) they have been lost in the past; (b) they have been lost in the great ACU move; or (c) there is some reason they are not getting printed on purpose; but all my cheats are original work.

I am getting curious as to what happened so could you , please contact me to fill me in on all the details. I would really appreciate it.

John Girvin
Belfast

ACU: I'm just off into the postbag. If you don't hear from me again you know why.

Angry reader

I have been an avid reader of ACU and *CWTA*, later *CPC Computing*, since 1982, and was delighted at the merger in the January, 1989 issue, expecting a "bigger, better, stronger magazine". What happened? You increased the number of pages but mainly with advertisements and games reviews.

Take the July, 1989 issue. It consists of 84 pages. Advertisements 35 pages – 41.6 percent; games reviews 11 pages – 13 percent; Listings six pages; Combat Zone four pages; competition three pages; profile three pages; interview two pages; letters three pages; Advice/Mcode/Microscope nine pages; news two pages; chart one page; contents/front cover two pages; features two pages.

It appears that the magazine is slowly becoming just another magazine for the younger age group at the expense of those who wish to be a little more serious about the use of our machines.

On a different note, what happened to the "loads more goodies" as advertised on page 57, March, 1989? I took a subscription that month for ACU, but have still not received the free binder or the special anthology – page 72, March issue 4.

A.D. Scott
Blandford Forum
Dorset

ACU: We though it was better but we hear and obey.

Solved

The answer to Geoff Marshall's problem Elliptical Circles, July page 777, which is effective with my 6128 and DMP2000 is:

1. Switch on 6128.
2. Put printer "on line".
3. Type-in Print #8, chrs(27); "?K"; chrs (5)
4. Run Mini Office II.

C.G. Longford
Ryde, IoW

Extra! Extra!

Trevor Cummings 'Micro-Scope' July is slightly misleading when he says we need a different DOS to read 80-track discs. CP/M stores the specifications of each drive in memory and they can be changed easily. When using CP/M, RAMDOS changes the specifications.

I know of at least three programs to allow 6128 users to use PCW single-sided discs and MML Systems, publisher of *The Amstrad CP/M Plus* which lists the basic information needed, has advertised several utilities, e.g. 80TRK.COM and FORMAT.COM, in the magazine which take advantage of this information to allow the use of different sizes and formats.

John Hudson
Huddersfield



You're booked

In your letters page of April, 1989, you printed an impassioned plea from a 6128 owner who needed a firmware manual. Your answer told him that the problem would be dealt with in a subsequent issue. It has not. At least not so far as I am aware. I, too need a firmware manual for my 6128. How do I get one?

Telephone calls to various Amstrad departments ended with nothing and not even a suggestion as to where I can get one.

F.A. Coppenhall,
Northwich,
Cheshire.

ACU: A few people have written to us in the last few months with book enquiries so we have decided that it is time for a book round-up.

Visiting time

Please relax. Sit back. We must take a journey back to the times of old, when great beasts roamed the earth and primitive man hid in caves. Many questions have been asked about those pre-historic days. Why did the dinosaurs die out? What happened to "Old Crumbly", editor of *Computing with the Amstrad*? More important can anyone help a tired key-tapping archeologist get his type-in of CPC fractals working?

I refer, of course, to the apparently rather good Mandelbrot set generating program in the May, 1987 issue of *CWTA*. It is supposed to use some ultra-cunning machine code to generate a fractal pattern, somewhat faster than an equivalent Basic program would. As you might guess, mine does exactly something else. All I get is horizontal lines of varying colours.

I know *CWTA* mind-melded with *CPC Computing*, which in turn was dragged screaming into the *ACU* life-support room and the author of the original software, Chis Ratcliffe, is probably a bank manager by now.

I would like to ask first if anyone knows of any printing errors pointed out in later magazines. I got all the issues but saved only the listings and articles; if this is not the case perhaps someone has a working copy they could give me? I have checked the listing and machine data twice thoroughly but I may still have been misreading something.

While we are on the subject, I have written a set of five screen dump programs, each giving a different-sized, and shaped, printout to use a Star LC-10 black printer and KDS 8-bit port. I would be willing to give them to anyone who has this set-up as the results are good.

The bad news is that they were written and compiled under CP/M because I do not have a Z-80 assembler. This means that the source code is Intel 8080 rather than Z-80 and may cause dizziness and nausea. The stuff still runs under non-CP/M conditions because I have written a utility to translate the FILE.HEX data – i.e., ASM.COM output – into friendly, smiling, binary AMSDOS files.

One more thing – I just read G.A. Robson's letter about FOURTRIS.BIN and I have the code he wants. If nobody else has sent it already. Tell him that I will meet him by the Metal Hawk podule in the arcade nearest the beach in Brighton.

Your magazine is good. I like it. The 10-Liners are good, the reviews are good and now I need it the letters page is good.

Ian Giblin,
Brighton,
East Sussex.

ACU: He crumbled away. Can anyone help? That is a little below the belt. Can we all visit?

Sorry!

I enclose a copy of my letter to you dated April 26.

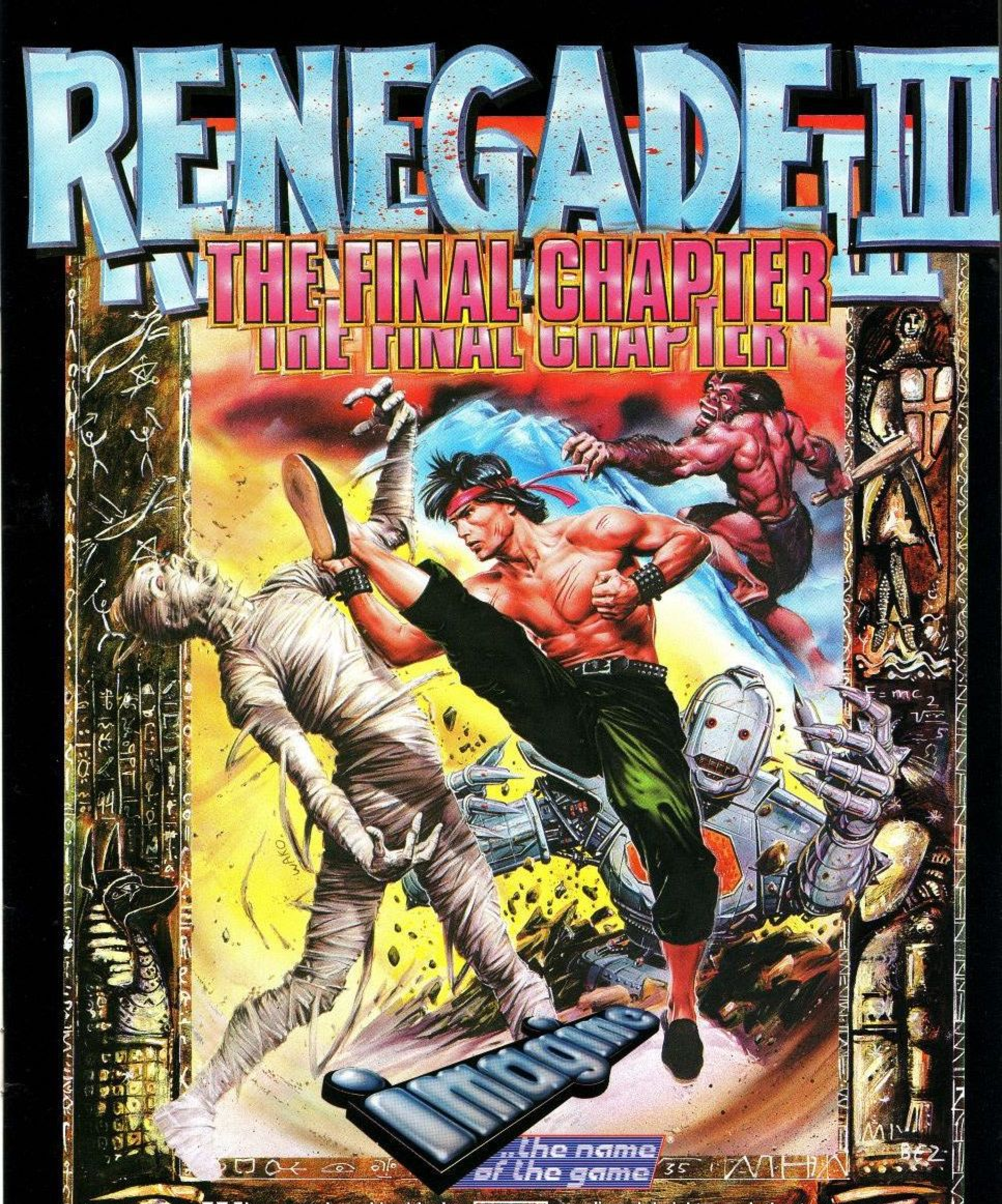
I have read previously that you do not have time to answer every query. Not having received a reply I looked in the July issue to see if it, or a similar query, appeared there. As it did not I am writing again as I suggest that this is not just another query but an enquiry regarding something supplied by you. When one buys a progam disc one usually has an idea what it contains and receives instructions how to access the contents.

Although I have run *Savage* and *Human Killing Machine* I have yet to see loads more goodies. Plus there is a selection of great type-ins including fast action games, powerful utilities and much, much more as promised on page 57 of the March issue.

In the cirsumstances I would have thought my original letter merited a reply and I hope I can now look forward to one in the near future.

A.A. Sinden,
Rye,
East Sussex.

ACU: The reason we have not replied directly is that we have had more than a few complaints of this nature, to say the least. We apologise and hope you can forgive us. We are only human after all.



When a guy loses his girl – he loses his mind! Now, in the Final Chapter, Renegade must summon all his strength and lightning reactions as he chases his girlfriend's captors through time itself. Fight against neolithic man, mediaeval knights, and the tormented undead from within the tombs of Ancient Egypt. Your quest finally takes you BEYOND the present – to a time you'll never forget! ... but remember ... your girl wants to see you alive!

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A little canon

FACE THE FAX

CANON has done it again. Its new desk-top Fax 120 with integral handset is now available from Action Computer. Supplies for around £845 including 24-month extended warranty and delivery, installation and training. The new system has one-touch dialling for 16 numbers and short dialling for another 10.

The 120 is compatible with CCITT Groups 2 and 3 and can transmit an A4 page in 17 seconds. Other features include automatic re-dialling, sequential despatching to up to 16 stations, automatic contract control and a five-sheet input tray.

For further information telephone 0800 333 333 the call is free.

BATTERIES INCLUDED

ANYBODY can now afford a portable printer. The Diconix 150 ink-jet portable prints at 150cps in draft mode and 50cps in NLQ mode but only measures 50 x 275 x 165mm, and weighs 1.7kg. complete with five size 'C' rechargeable nicad batteries.

The 150 is Epson/IBM-compatible and can print single sheets up to 228mm wide, continuous forms, fanfold stationery and film for overhead slides. It has a 2K buffer and three integral fonts, plus condensed, subscript and superscript.

For further information telephone Action on 0800 333 333, the call is free.

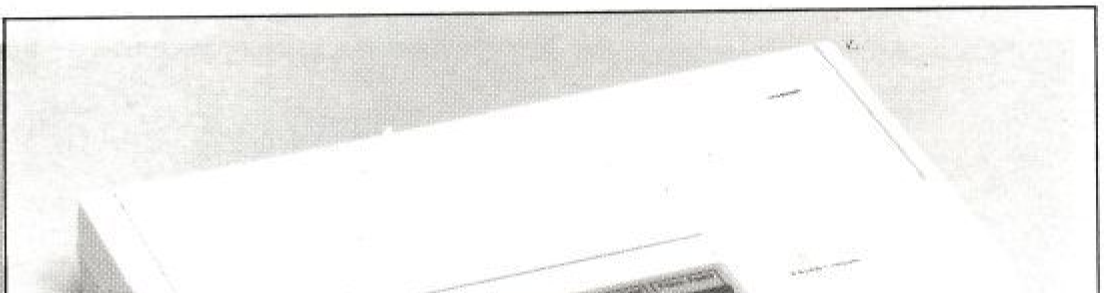
TWIN BIN

STAR Micronics U.K. Ltd launches its new Laser Printer 8 II T, a twin-bin machine, one of the fastest eight-page per minute printers on the market. The two standard input hoppers can each accommodate 200 sheets of A4 paper, while an optional high-capacity feeder can house 1,000 sheets.

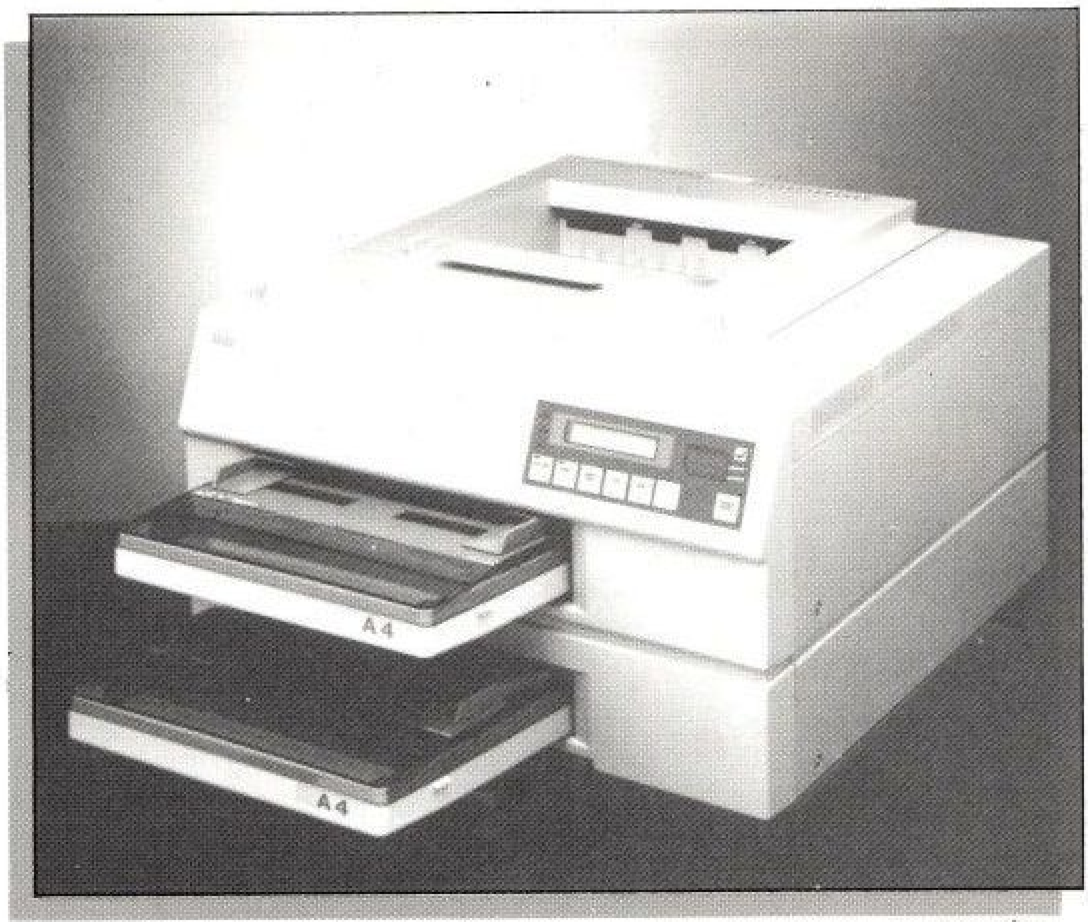
"One of the most significant aspects of this printer is that it is one of the few simplex, twin-bin lasers on the market," says Roger Bayley, Star national sales and marketing manager. "Most dual-feed laser printers are duplex, yet users rarely require the facility to print on both sides of the paper, so why should they pay for a feature they don't really need. The LaserPrinter 8 II T therefore represents an attractive, sensibly-priced solution."

Features of the 8 II T include eight resident fonts as standard which can be complemented via high-capacity plug-in font cartridges; up to 64 fonts can be combined on one page. Standard is a 1MB memory, which can be expanded to 5MB to handle the most complex graphics. To ensure total compatibility the printer has four main printer emulations, as well as both serial and parallel interfaces.

The Laserprinter 8 II T costs £2,589 including 12 months' on-site warranty. For further information contact 01 - 840 1800.



Smooth operator



It's a star

PLEA FROM A NEWSLETTER

THE news-letter A-PUG Amstrad Postal User group and needs support and turned to *ACU* for help. In turn we send its message to the readers.

Joining A-PUG will cost £2.50. For that, you will receive a monthly bulletin with various offers and plenty of competitions, plus connections with companies which sell cut-price games. There will be competitions galore, prizes, discs, T-shirts, cassettes, posters and much more.

For further information contact Andrew Scott, 22 Sand Street, Soham, Ely, Cambs CB7 5AA.

WHAT A JOY . . . STICK

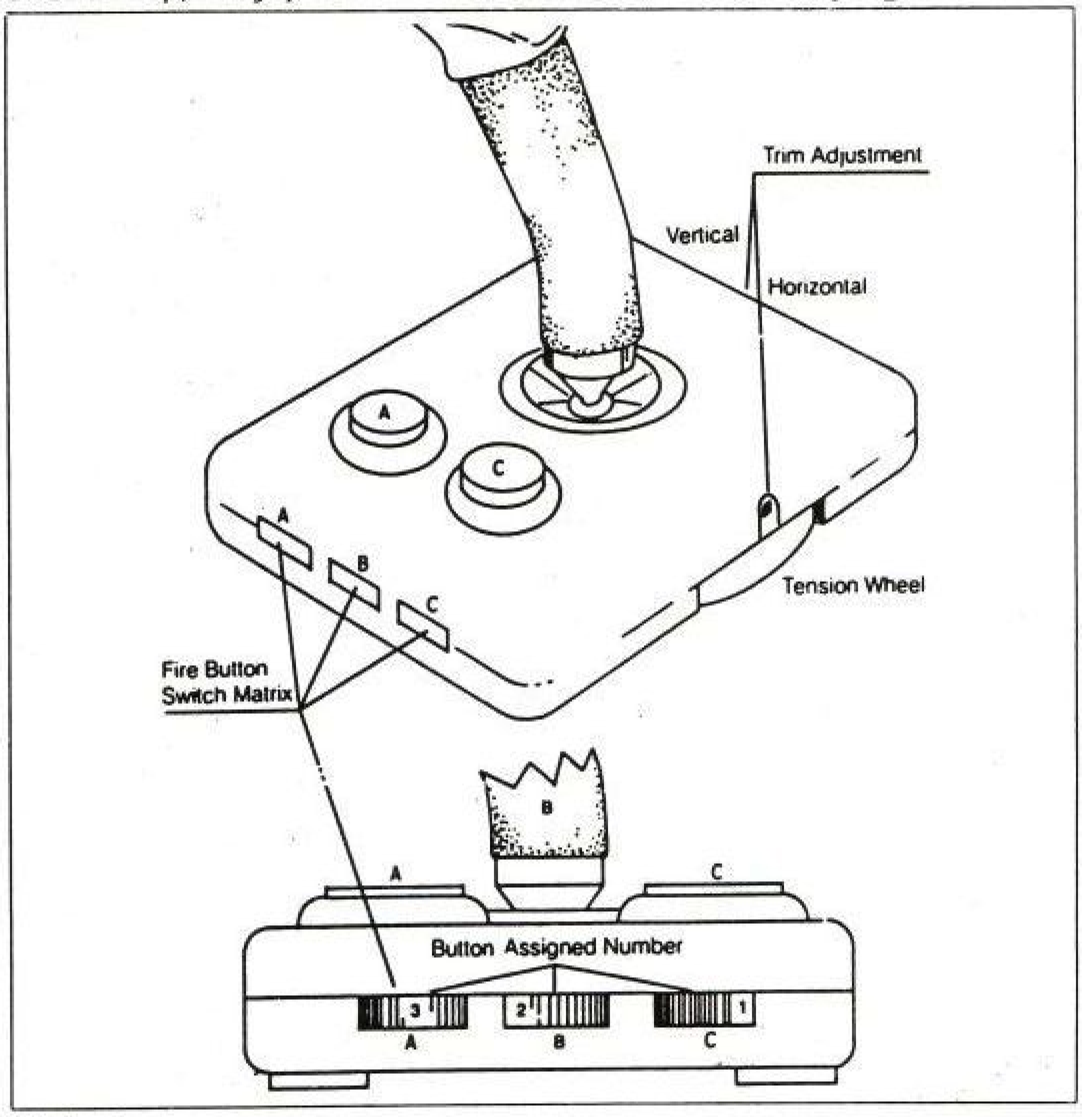
SOME in the business call it the greatest joystick ever marketed. There is little argument over its exceptional qualities and even fewer about its good looks. The advanced Gravis MK VI analogue controler is the result when high technology meets an old problem.

The MK VI has taken the Canadian company Gravis more than five years to develop but it claims the user will feel the difference in only five seconds.

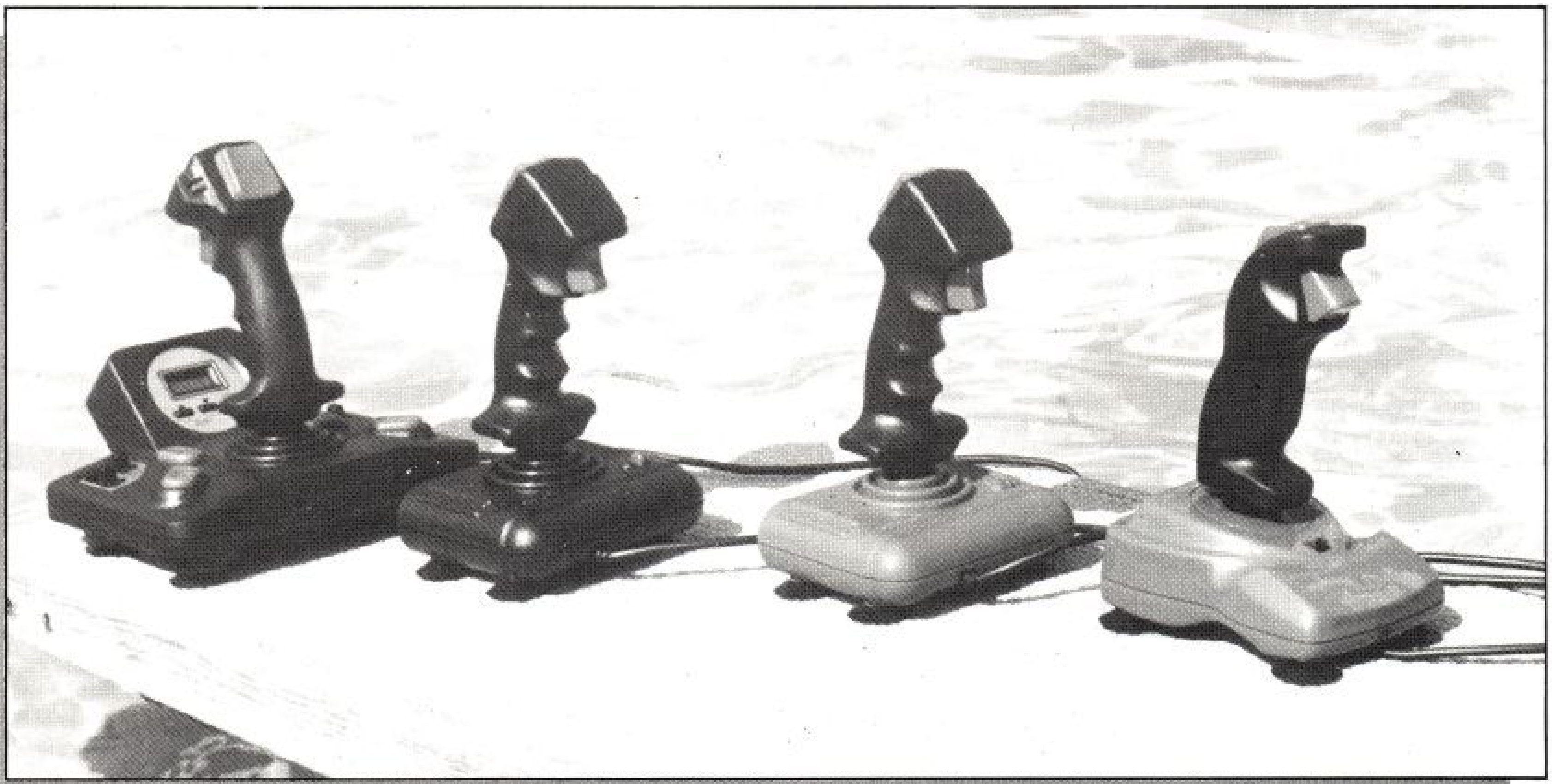
As today's games reach higher levels of sophistication, it only follows that a joystick should exist to fulfill total playability. The pistol grip is full-size and covered with foam rubber for comfort and control, handle fire button, eight-position centring tension control – adjustable to meet every need – three independent microswitch fire buttons with programmable functions plus a one-year warrenty.

```
100 'JOYSTICK READER
110 '(C) COPYRIGHT FRED BLECHMAN 1988 *
120 CLS:STRIG ON 'Standby to read BUTTONS
130 PRINT:PRINT"     Make sure a JOYSTICK is plugged into the GAME PORT.....
140 LOCATE 4,1:PRINT"LEFT-RIGHT","UP-DOWN","BUTTON 1","BUTTON 2"
150 LR=STICK(0):UD=STICK(1):B1=STRIG(1):B2=STRIG(5)
160 LOCATE 5,1:PRINT LR,UD,B1,B2
170 GOTO 150
```

Once set up, the joystick can be tested with this short program



What a joy



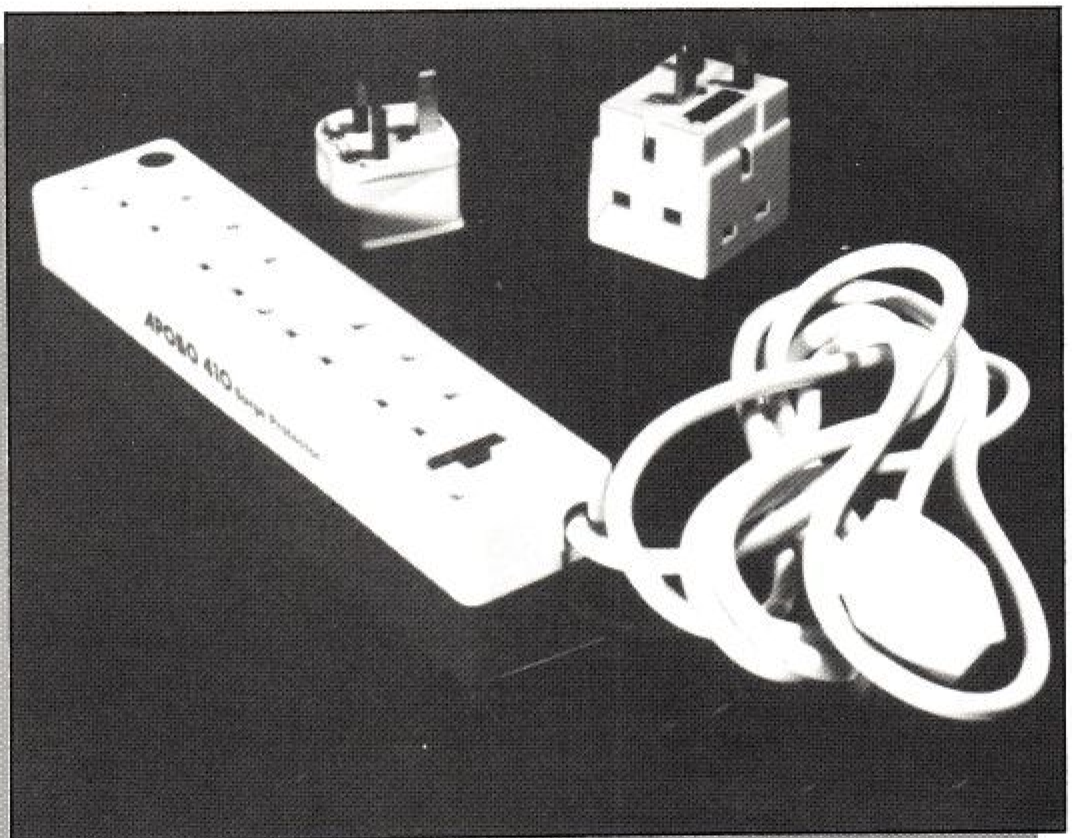
Joy division

UNDER FIRE

IT is open season and manufacturers are showing their latest products. De Gale Marketing announced three new joysticks to complement the Supercharger in the Quickjoy range. Prices range from £8.95 to £19.95.

All joysticks have finger and thumb fire buttons, auto-fire, eight direction control and four suction cups.

The top model is the Quickjoy V Superboard. With six fire buttons, a speed-controlled autofire and sleek 10 micro switches gives the player ultimate control. As a final touch the Superboard has a built-in digital stop watch with LCD display.



Pure power

PLUGGING A PROBLEM

COMPUTERS, monitors and television sets are particularly vulnerable to mains interference, which can damage hardware, corrupt data and cause games to crash, usually when you are on the verge of a massive score.

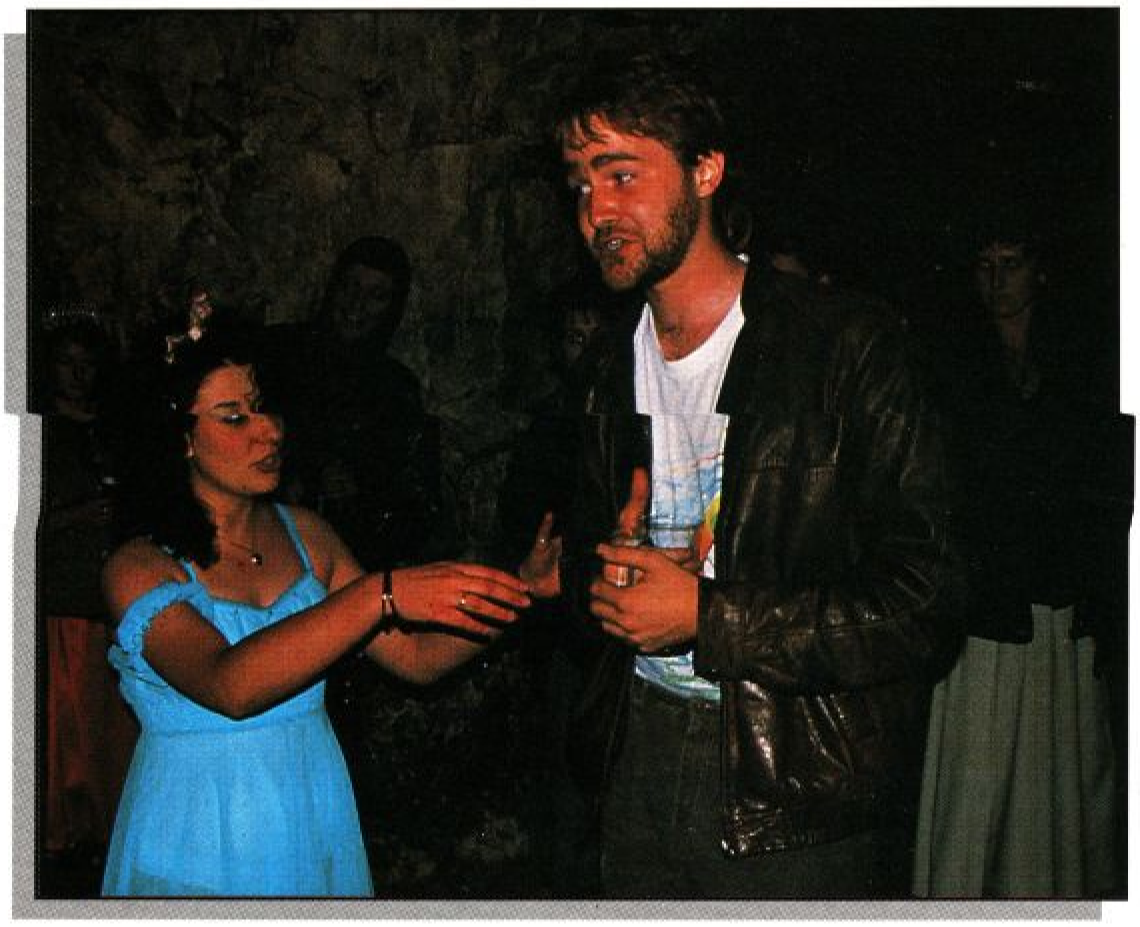
The most common type of such interference is a mains spike, which can be produced by washing machines, power tools, microwave ovens, irons and coffee makers, or even the result of a neighbour using those types of equipment.

A solution is at hand which can protect you from these problems. Apollo Electronic Products Ltd has produced a spike suppressor for less than the price of a 16-bit game. The device is simple to instal and easy to forget.

The range includes a plug unit for around £12.50, a three-way adaptor at £16 and four-gang strip adaptor at £35. All prices include postage and packing and VAT.

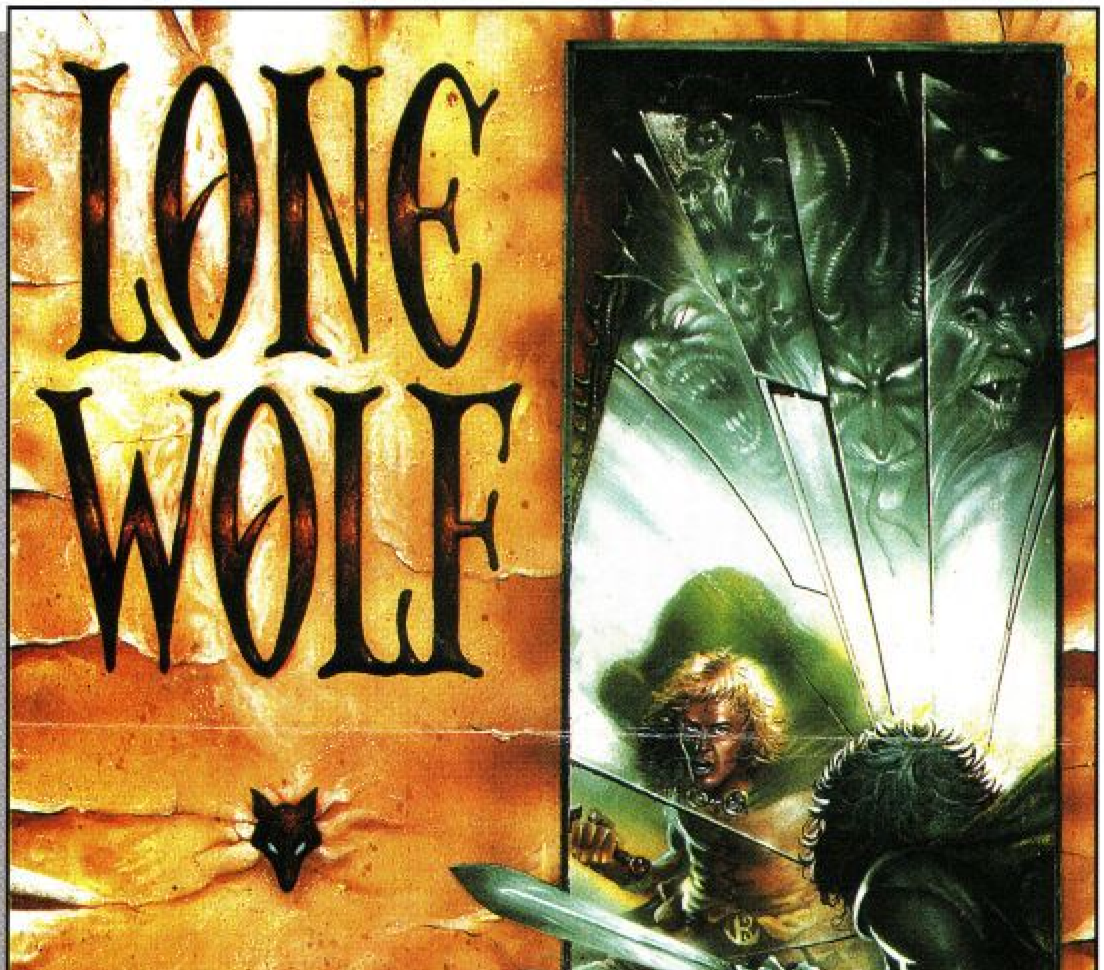
For further information contact Apollo Electronic Ltd on 04858 8156.


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UNIT 4 STANNETS
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PHONE: (0268) 541126
SCREENSHOTS FROM AMIGA VERSION



Every so often there is a hero of such metal that all fall before him. Being such a hero can have its dull moments, so what we want you to do is draw a monster of your own devising which will test the skill of the mighty hero *Lone Wolf*.

The winner will receive an engraved chalice with signed copies of the two new Lone Wolf books, *Eclispe of the Kai* and *The Dark Door Opens*. Two more winners will receive the two signed books. As an added bonus, all three winners will see their creations in print.

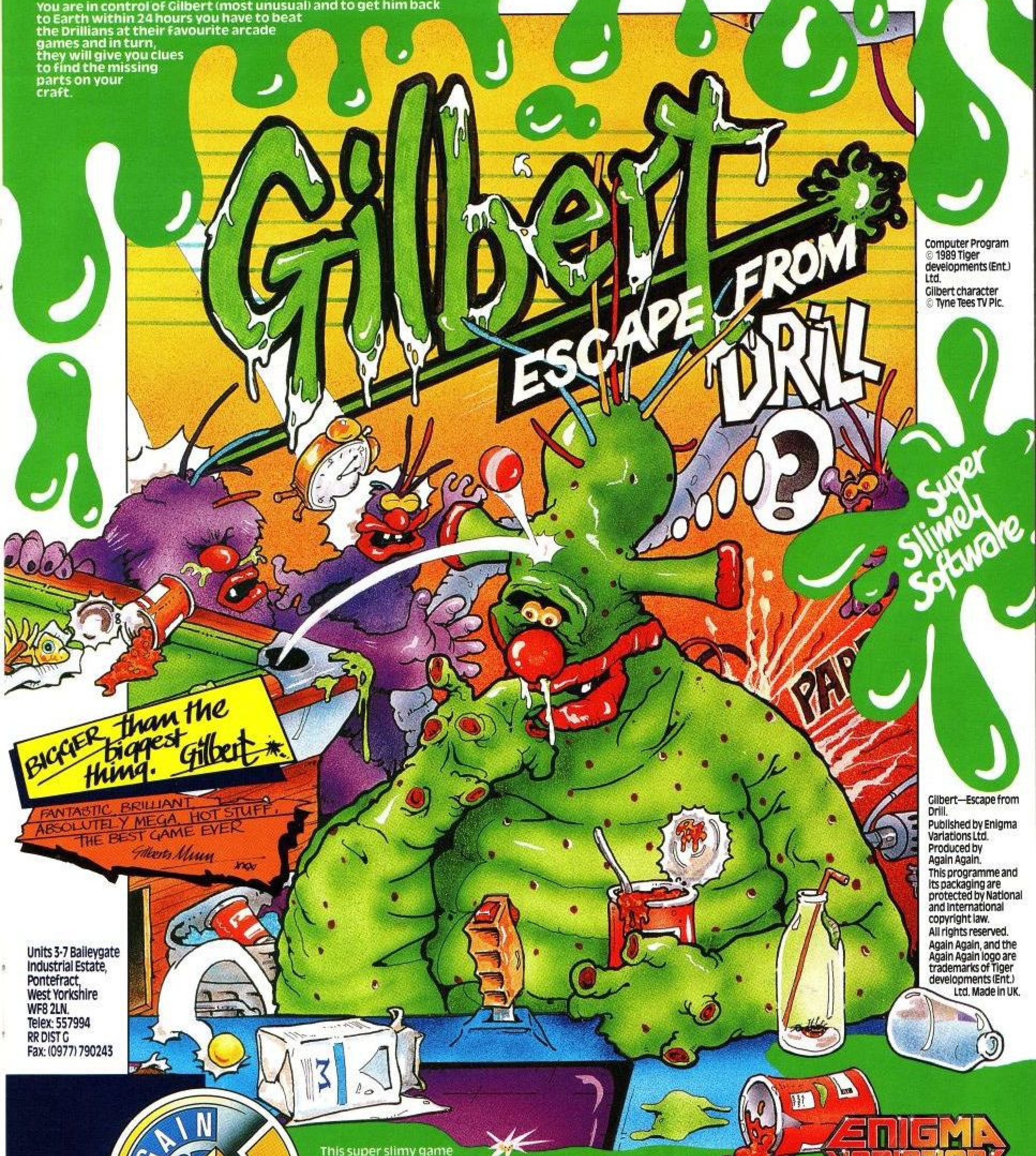


AMSTRAD COMPUTER USER

THE OFFICIAL AMSTRAD CPC MAGAZINE

Send your entries to:
Amstrad Computer User,
Avralite Ltd, Greencoat House,
Francis Street, London, SW1P 1DG.

Gilbert is back at Drill and feeling very pleased with himself.
Unfortunately, the rest of his fellow Drillians are not quite so happy. In fact they are green (and slimy) with envy.
Gilbert is invited back to Earth to do a new TV series, but to avoid more of his bragging the Drillians remove parts of the Millenium Dustbin and spread them about the planet.
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Combat Zone

Enter the world of the neon warrior with arcade ace John Cook.



We start this month with a little community singing. If my memory serves me correctly I think there is a GI route marching song which is appropriate. How does it go? "If I should die in a Combat Zone, pack me up and send me home." Perhaps this is the wrong medium for sound effects.

Still, it is warm on the streets, boiling on the beaches and in the arcades they are having to hose down the players as they stand before the monitors. The arcade operators love it as we all go on holiday and whack the mazooma into the games while we are at it. There are some great games on release on which to spend money this summer.

You will remember that last year the game which had all the punters queueing to play was that now

classic game, *Operation Wolf*. I should explain that it was a dedicated unit with a facsimile of a Uzi machine gun mounted on the front. You grabbed the gun and sprayed the large and lifelike enemy sprites with everything you had.

Many people liked it; It was a number one coin-op round the world and a number one on home format machines, including the CPC. I disliked it because of the idea of pointing a gun at large human sprites and watching them die painfully is not my idea of a great time. The philosophers among you will point out that there is little difference between blowing away pielated mahacioed Sandanistas and giving hell to aliens.

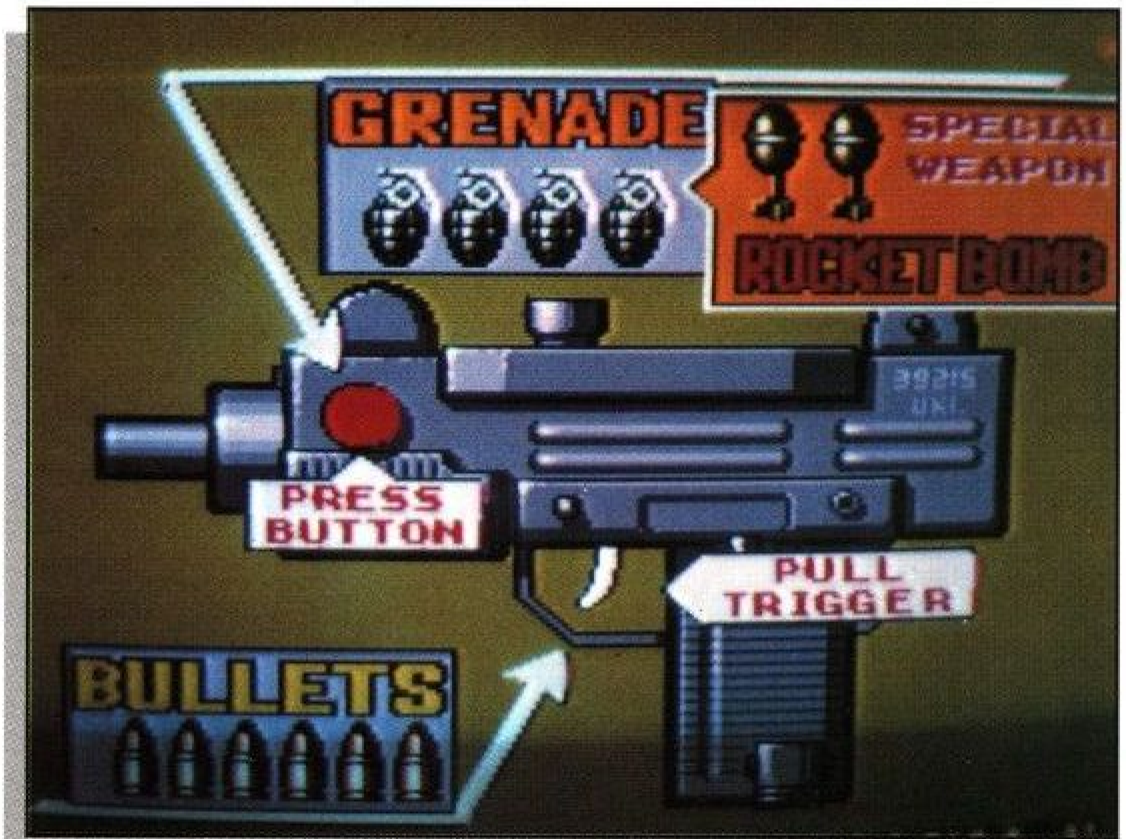


Step into the future

I figure that blasting amorphous alien spaceships is a competitive exhilarating, hand-eye co-ordinational activity, mostly harmless. It starts to become a little unhealthy when, in violent games, the element of realism goes over the threshold where a 'reasonable' person might begin to confuse fantasy – the game – with reality.

Shooting aliens can never be anything other than fantasy; the same reasoning applies to any kind of sword and sorcery game. Games are supposed to be fun. Operation Wolf is more than just a shooting gallery, as anyone who has played it will tell you. You can get an odd kind of satisfaction playing it – an astonishing level of excitement can be reached during the game – but on a different, darker level than the kind of high you will get playing another kind of shoot-'em-up, say *Thundercross*.

Operation Wolf is just not my kind of game but I would be interested to hear your thoughts on that in particular and vids in general.



One mean and lean hero just uzing death and destruction.

Taito produced a follow-up to Operation Wolf; we reviewed it a few months ago; called *Operation Thunderbolt*, its main modification was that it was a two-player unit. For some reason it was not so, good as its predecessor. Now, however, SNK has a game in the same style but with that little elusive extra something lacking in Thunderbolt, called *Mechanised Attack*.

The format is very much the same. There are either left/right scrolling levels with nasties rushing on – human and mechanical – which you have to shoot with the Uzi as soon as you can. For those particularly fraught moments you have a grenade launcher attached to the gun, too.

There are other levels which have things zooming towards you as well and, at the end of a particular scene, there is an end-of-level big thing you have to destroy with speed.

Ammunition is limited, as with Operation Wolf – but can be picked up along the way in the form of icons which you shoot to gain extra bullets or whatever. There are six kinds of power-ups giving you extra ammunition of different kinds, restoration of wounds or temporary invulnerability to enemy fire.

The gameplay is nothing new but it has become very popular, very fast; it seems to have an addictive quality lacking in Operation Thunderbolt and the punters are resonding to that with their coins. Although it is not so gratuitously violent as Operation Wolf, it is still not the kind of thing I admit to liking but



perhaps you are different and it certainly is the best of the shooting gallery games at this time.

There is an even newer shooting game on test at the moment, *Dynamite Duke*. It reminds me a little of *Dead Angle* in that you are represented on-screen as an outline figure which delineates the area where, if the enemy bullets fall, you are hit. The on-screen view is behind the head of the character; effectively you are seeing through yourself. I have not played it enough to give a definitive opinion but it looks well worth a try if you see it.

The best game I have played this month is a new driving game from Sega – so new that there are only two units in the U.K. at the moment. Thanks to the Old Compton Street arcade, Family Leisure, for letting me get to it at seven o'clock in the morning recently for some uninterrupted play. That game is certain to be another Sega mega-hit, *Super Monaco Grand Prix*.



There are some great driving games at the moment. The Sega *Power Drift*, for instance. Then there is *Hard Drivin'* from Atari Games, a breakthrough product using filled vector techniques. Namco has the memorable *Final Lap* and the superb – but mysteriously unreleased as yet – *Winning Run*.

I must say that Super Monaco Grand Prix might have the makings of beating them all. It is a Formula One simulator, of course, but its like has never been seen previously. It is fast, colourful, loud and has a range of difficulties from entry level automatic gear change to a seven-geared monster with a narrow power band for each gear.

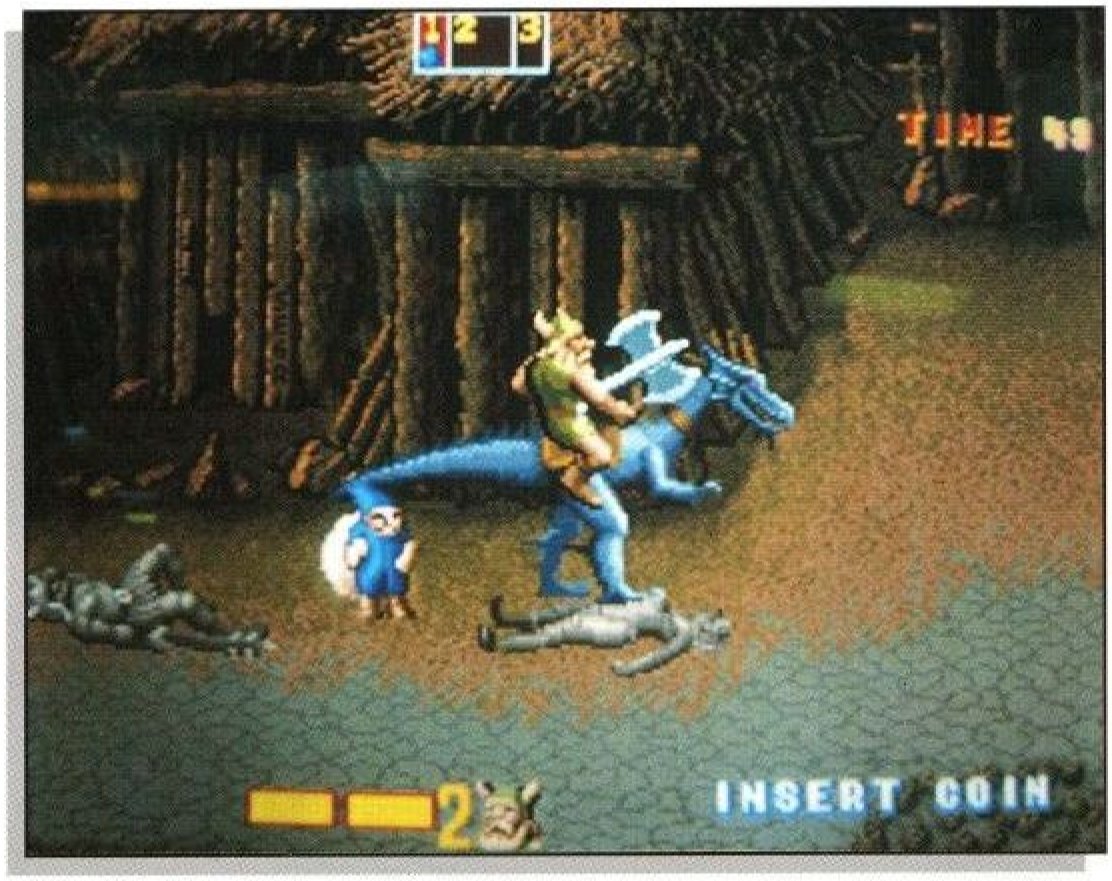
On inserting your coin you have to make a choice of the automatic option – highly recommended at the beginning – a more powerful four-speed car, or the fully race-tuned seven-speed vehicle.

First you have to qualify over the short circuit. The speed of the machine and the detail of the graphics is the first thing to strike you. Then you end up striking something else – the Armco of the first corner. SMGP is not easy.

Make it to the main race and you will find yourself in for a hell of a ride. The other cars are fast and ruthless and you will be concentrating on staying on the track so much that you will scarcely notice the highly-detailed scenery of Armco flying past you. The noise of your car and the instructions of your pit crew seem to be absorbed as part of the experience. Added to that is the

Driving in style





Dinner time Din.





Dead end

vibration of the engine, transmitted via the seat.

There is a kind of head-up display superimposed on the screen, the most important being your current position in the race and the current position limit. If your position falls below that limit, which is clocking down all the time, it is the big game over. Finishing three laps in the top three positions means you can race again. Initial play-testing suggests that there is no way you can do this unless you choose the more powerfully-geared cars, which are tricky to operate.

Gear changing is semi-automatic. No clutch and gear lever but a yellow butterfly lever spanning the rear of the steering wheel. Pressing it on the left changes you down; on the right changes you up. You will need plenty of practice on automatic learning the course before you can try those options.

Overall, the most impressive driving simulator to date, the only thing SMGP lacks is the head-to-head element of Final Lap but other than that it is one of those games you will have to play when you see it.

Sega is on a roll at the moment; it also has a hit on its hands with a PCB game, *Golden Axe*. It is a great fantasy bash in which you, single-handed – or with a companion – have to take on Death-Adder. Before you get him, though, there are plenty of minions which have to be disposed of first. You start with the choice of one of three characters – the hunky Barbarian, the curvaceous Amazon, the short Dwalf. Each has slightly different characteristics, so choose wisely. Generally, the Amazon is a little wimpy but can use the magic potion you pick up very well, as opposed to the Barbarian, who is hard but a bit thick. The Dwalf seems to fall somewhere between.

The graphics are superbly drawn, the sound is excellent and the gameplay challenging with you needing to engage your frontal lobes as well as the motor sections of the brain. The trade has already gone loopy about Golden Axe. The chances are you will, too.

Finally this month, a few quickies. *Strider* is the newest from Capcom, a jumpy-jumpy set in the future Soviet Union with reasonable gameplay and characteristic Japanese graphics – not at all bad. A new beat-'em up from Konami, *Crime Fighters*. Firmly in the *Double Dragon* mould, you punch, kick and butt your way through the punk-infested subway.

Dragon Breed is a great fantasy blast which has you riding a dragon in a *Nemisis*-like environment. Very well-thought-out gameplay on this one; try it if you can.

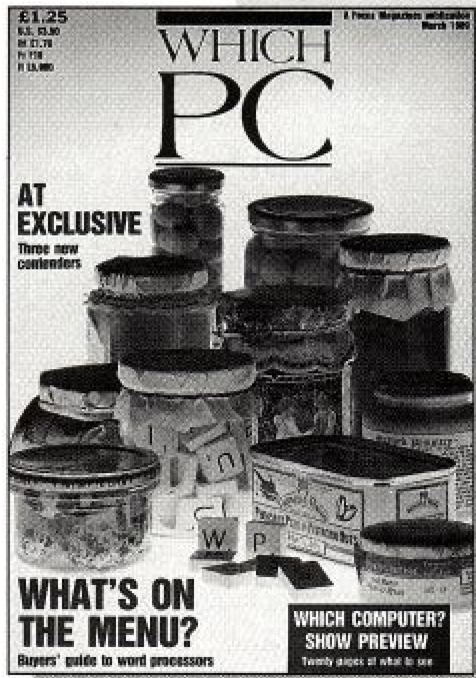
That is it, except to throw down the gauntlet to all pinball players. The new machine from Williams, *Jokerz*.. I had a high score of 14,798,000 odd on a three-ball machine.

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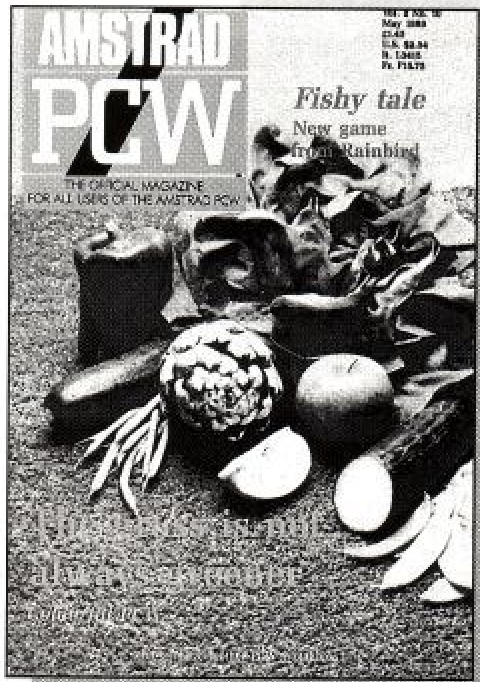
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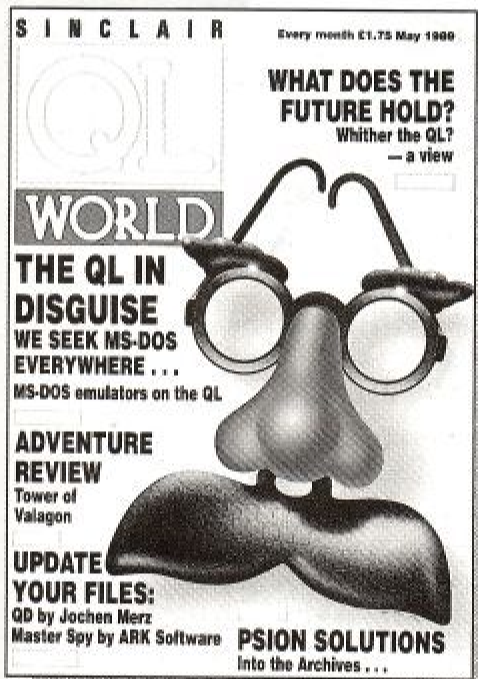




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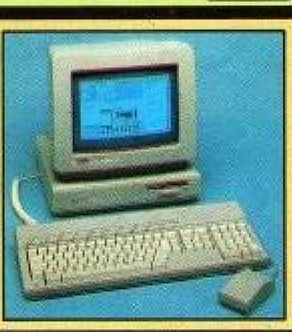
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Through the Microscope

This month Trevor gets technical with the Z-80

Most computer users imagine that hardware is so difficult that they could never understand it. Unfortunately that misconception keeps them from a thoroughly enjoyable side to their hobby. I hope to demonstrate that hardware is not difficult but is positively easy to understand and, in doing so, perhaps I might open the way for many readers to add this fascinating aspect of computing to their enjoyment.

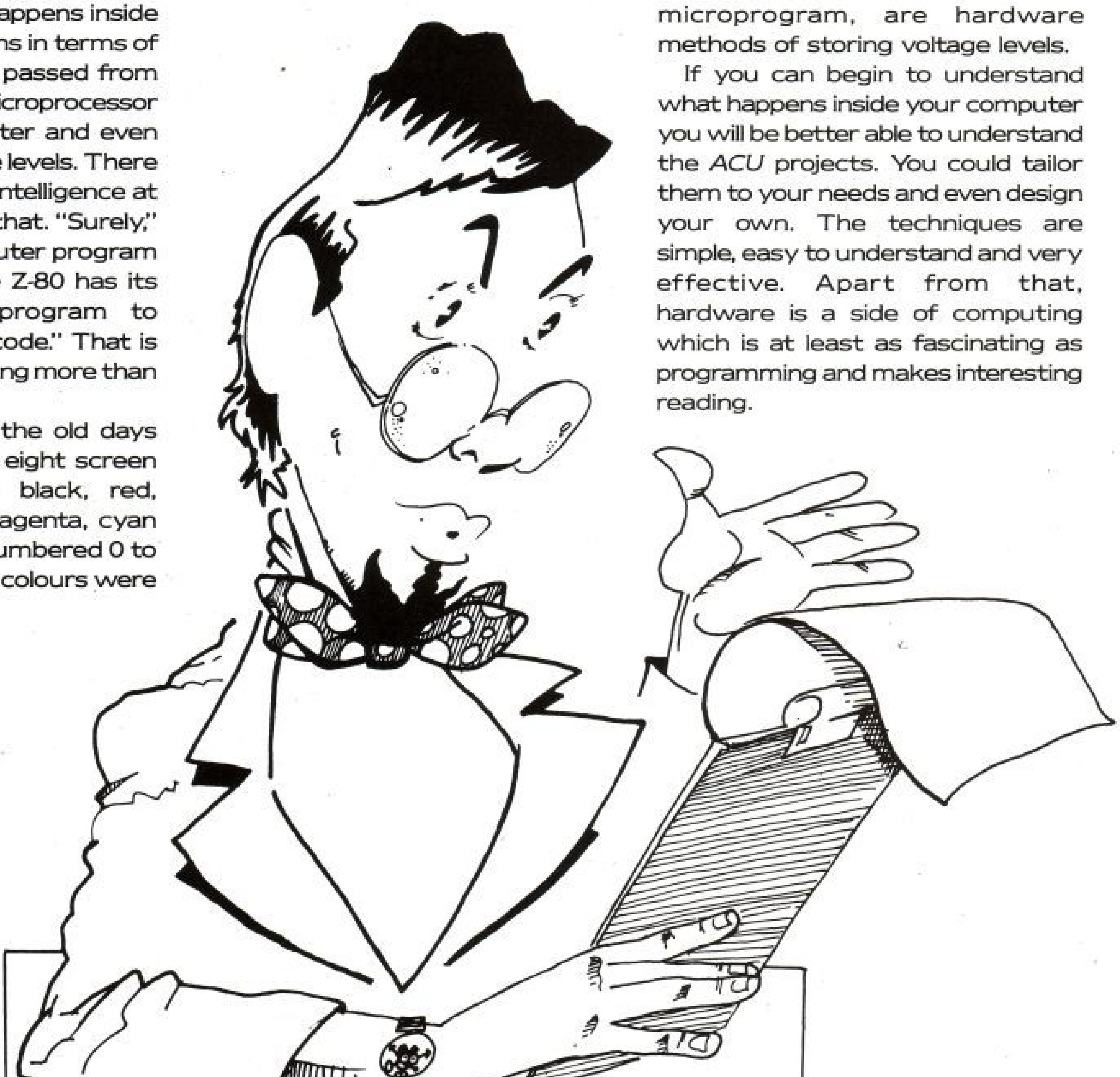
Everything which happens inside your computer happens in terms of voltage levels. Data is passed from the keyboard to the microprocessor to the disc drive, printer and even the monitor as voltage levels. There is no other computer intelligence at work in the CPC than that. "Surely," you may say, "a computer program is intelligence and the Z-80 has its own internal microprogram to understand machine code." That is true but they are nothing more than stored voltage levels.

Do you remember the old days when computers had eight screen colours? They were black, red, green, yellow, blue, magenta, cyan and white and were numbered 0 to 7 in that order. Screen colours were specified using those numbers which naturally appeared, in binary, on the data bus. Now think of 0 to 7 in binary; 0 = 000, 1 = 001, 2 = 010, 3 = 011, and so on until 7 = 111 and imagine the proper line of the bus connected to the red of the RGB socket, the next line to green and the third to blue.

When the colour code for red (001) appears on the bus, the red line to the monitor goes to high voltage while G and B remain low, thereby producing red on the screen. For yellow (O11), R and G are high, causing red and green to mix and produce yellow.

Things are not so easy as that, since colour codes are used to modify the colours for text and graphics but it serves as an example of how data works as voltages. In fact, computer memory cells, including ROMS and the Z-80 internal microprogram, are hardware methods of storing voltage levels.

If you can begin to understand what happens inside your computer you will be better able to understand the *ACU* projects. You could tailor them to your needs and even design your own. The techniques are simple, easy to understand and very effective. Apart from that, hardware is a side of computing which is at least as fascinating as programming and makes interesting reading.



At the heart of the CPC is the 40-pin Z-80 microprocessor chip. The ADDRESS BUS is a set of 16 wires labelled A0 to A15, which carries the address being accessed from the Z-80 as high and low voltages. POKE &BC46,&9E would produce 1011110001000110 (&BC46) on the address bus where 1 = high voltage and 0 = low voltage.

The maximum number with 16 binary digits is &FFFF or 65535 or 64K. That is why the Z-80 is limited to 64K of memory. More than that requires some fancy logic. The DATA BUS is the same except that it has eight lines and carries the data. In the foregoing example it would have 10011110 (&9E) on it.

That accounts for 24 of the Z-80 pins. Another two are used for its 5V power supply and ground. Three more I want to mention are MREQ – Memory REQuest – which the Z-80 sends low during a memory read or write operation to indicate that the address on the address bus is valid. RD – Read – which goes low to indicate that the Z-80 wants to read data and WR – WRite – which goes low to indicate that the Z-80 wants to write data. They are *control lines* and are used to control the flow of data round the computer and its peripherals.

If we have a huge 64K memory chip with 16 address pins, eight data pins, a Chip Enable pin which we can send low to turn the chip on and an Output Enable pin which, when low, will cause data to be output and, when high, will cause data to be stored, we can connect the address and data pins to the Z-80 buses, CE to MREQ and OE to RD.

When the Z-80 reads a byte of data bus from the address on the address bus, the Z-80 then stores the data in one of its registers. For a write operation, RD (OE) would stay high and the memory would store what is on the data bus in the address indicated by the address bus.

In practice, there are more things to take into account but nothing much more complicated. A long program is easily written in small portions, so an entire computer is not too difficult to design in small pieces similar to this example.

Now that we have seen how a memory address becomes a set of 16 high and low voltage levels, let us see what else we can do with it other than access memory. Let us suppose that we want to turn the hi-fi on an off from the computer keyboard or even from a program. We can reserve a byte of normally unused memory and arrange a decoding circuit to switch the hi-fi only when the address of that byte is on the data bus.

The diagram shows a simple decoding circuit for the address &BE30. All 0s are fed to NOR gates which output a high (1) only when all inputs are low (0). All 1s are fed to NAND gates which output a low only when all inputs are high. The same is carried through until a single output is achieved which will be high only at the time when &BE30 is on the address bus. At all other times it will be low. It can be used to toggle a logic switch and from there our hi-fi.

There are easier ways of decoding but this method demonstrtates two of the most commonly-used gates in computers. It also shows what to do with unused inputs and a way of inverting a signal – see the NOR gate with all its inputs connected together. Study the truth tables and you will see that a NAND gate does the same.

The Z-80, clever device that it is, can access a second 64K called In/Out addresses and it sends its IORQ – In/Out Request – pin low to let the outside world know that the address on the address bus is not intended for the memory but for a peripheral. So we do not need to find unused bytes of memory for our hi-fi; we have 64K of them. In theory, we could decode all 65,535 addresses and have a peripheral on each one but who would want to do so? The use by the CPC of the I/O map is very neat and only a few address lines need to be decoded for each peripheral.

It works like this. Only one of the top six address lines (A15-A10) can be low at any time. The low line selects a particular I/O device. If A12 is low, for instance, the printer port is selected, so the only lines to decode are A12, IORQ and WR, since we want to write only to the printer. Whenever these are simultaneously low the printer port is written to. In some cases, lower address lines are also used.

All low will select the 8255 PPI – parallel peripheral interface – through which the keyboard, tape deck and others are accessed. In the 8255 are four registers which are addressed by A9 and A8. Study the

TRUTH TABLES

NAND GATE

In1	In2	Out
0	0	1
0	1	1
1	0	1
1	1	0

NOR GATE

In1	In2	Out
0	0	1
0	1	0
1	0	0
0	0	0

NAND gate: the output is 0 only when **all** inputs are 1

NOR gate: the output is 1 only when **all** inputs are 0

full table – it is very interesting; x = don't care.

For the expansion channels, A5 to A9 are significant and are used for such things as the disc interface. A5 low selects a communications channel. A6 low is reserved and A7 low selects the disc system. Each peripheral uses a large portion of the I/O map. Even so we have 127 addresses of the expansion channels area free for use. They are F8EO-F8FE,F9EO-F9FF, FAEO-FAFF and FBEO-FBFF. F8FF is a general peripherals re-set.

A15 low	011111 xx xxxx xxxx	76xx-7Fxx	Video Gate Array
A14 low	101111 .. xxxx xxxx		CRT controller
	101111 00 xxxx xxxx	BCxx	out to register select
	101111 01 xxxx xxxx	BDxx	data output
	101111 10 xxxx xxxx	BExx	status input
	101111 11 xxxx xxxx	BFxx	data input
A13 low	110111 xx xxxx xxxx	DFxx	Roms access
A12 low	111011 xx xxxx xxxx	EFxx	Printer port
A11 low	111101 .. xxxx xxxx		PPI
	111101 00 xxxx xxxx	F4xx	Port A
	111101 01 xxxx xxxx	F5xx	Port B
	111101 10 xxxx xxxx	F6xx	Port C
	111101 11 xxxx xxxx	F7xx	control register
A10 low	111110 .. ...x xxxx		Expansion channels

To use one we must decode IORQ and A10 as low, RD and/Or WR as low, depending on the operation required, A8 and A9 may be decoded but if not we will use all the free addresses. A5-A7 must be high and the rest do not matter.

The purpose is to gain understanding and a little study with pencil and paper is essential. It is by doing the job, even on paper, that questions and ideas dawn. Could the data bus be used to address a register after the address bus has selected the chip? What would happen if two of the top six I/O address lines were low at the same time? Since the CPC has a three-line RGB output, how do we get 27 colours – 3x3x3 = 27? Think about it.

I hope that this has been an interesting introduction to understanding computer hardware. From time to time I will delve a little further into the CPC and see how the various elements link. In the meantime, perhaps you would like to try designing a decoder for all 16 + IORQ lines of I/O address FBEO. You can do it with the information in this column. Then decode the same I/O address using the least number of lines possible but ensuring that none of the CPC peripherals produces the decoded output.

PRINTER PORT UPDATE

I trust everyone has last month's 8-bit printer port project up and running and is ready for hints and tips. For a start there are times, such as listing a program to the printer, when eight bits can get in the way. A switch fitted as shown in the diagram wil allow the port to be turned on and off as needed.

Some printers have a second character set, such as italics, and a high set codes above 127. The high set can be accessed in *Tasword* and *Protext* by changing the codes of little-used characters from within the program. Also the Tasword second set codes could be changed. Protext with *Promerge Plus* on ROM is different. To handle its background printing routine, lines 10,20 and 95 of last month's Basic program should be removed and the following lines inserted:

```
10 POKE &BD31,&C3
15 POKE &BD32,&10
20 POKE &BD33,&BF
95 DATA &F1,&44,&88
```

The various typestyles and heights which *Qualitas Plus* can produce together with an 8-bit port make some very attractive printing and, because of the eighth bit, many characters are greatly improved. The printer high set can be mixed with the standard fonts but cannot be printed in a Qualitas style. In tests to date our 8-bit port does not interfere with Qualitas output. *Brunword* and *Mini Office II* will be looked at next month.

One final tip. For the benefit of the DMP1 printer, the 664 and 6128 have a Print Translation Table, stored in RAM, which is looked at each time a character is sent to the printer. If a high set character code in the list A0,A1,A2,A3,A6,AB,AC,AD, AE,AF is sent it will be changed for a low set code. Any attempt to print one of these codes will result in the low character going to the printer instead.

The table begins at &B805 and can contain up to 20 pairs, a throwaway code and a replacement code. Ten of them are used but can be changed to 00s so that no swapping would occur. They can also be added to. That is the other way to reserve certain keys for top set characters which I mentioned last month.

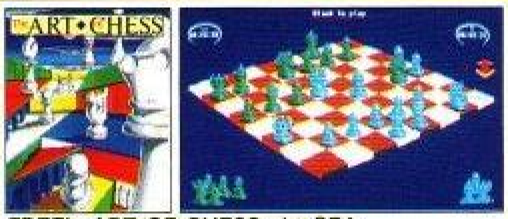
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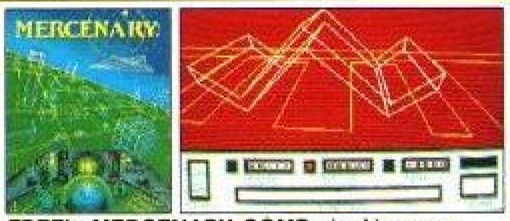
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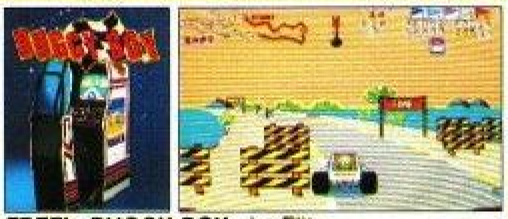
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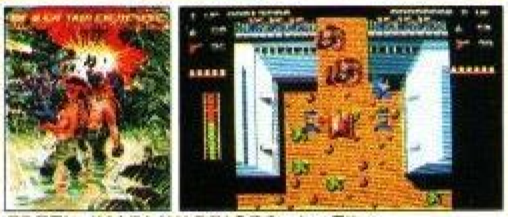
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10 LINERS

ELVIS BY MARTIN GILLIBRAND

Two tunes from the king of Rock 'n Roll, Love Me Tender and Are You Lonesome Tonight?

```
1 ' ELVIS by Martin S Gillibrand.1989.          (LOVE ME TENDER &
        ARE YOU LONESOME TONIGHT.) [71]

5 ENV 3,1,-1,8   [07]

10 READ no,du:IF no=-1 THEN END  [99]

20 SOUND 1,no,-du,15,3  [4F]

30 GOTO 10 [74]

100 DATA 213,4,159,4,169,4,159,4,142,4,190,4,142,8,159,4,169,4,190,4,169,4,159,1
2,95,3,84,1,95,4,213,4,159,4,169,4,159,4,142,4,190,4,142,8,159,4,169,4,190,4,169
,4,159,12,127,4,127,4,127,1,127,3,127,4,127,4,127,8,127,4,142,4,159,4,142,4,127,
16,127,4 [B1]

110 DATA 127,3,119,4,127,4,142,4,190,4,142,8,159,4,169,5,127,6,142,2,159,16 [C9]

120 DATA 190,2,159,2,119,4,127,6,119,2,127,8,190,2,159,2,127,4,142,6,127,2,142,8
,190,2,159,2,142,4,159,4,142,4,159,4,179,6,190,2,142,14,179,2,142,2,119,4,127,6,
119,2,127,8,179,2,159,2,127,4,142,6,127,2,142,6,213,2,190,2,179,4,159,4,142,4,11
9,4,127,6,159,2 [FF]

130 DATA 190,20,159,2,142,2,134,4,142,4,159,4,119,4,142,6,119,2,159,4,179,4,190,
4,179,8,142,2,127,2,119,4,127,4,142,4,106,4,127,6,106,2,142,4,159,4,169,4,159,8,
190,2,159,2,119,4,127,6,119,2,127,8,119,2,113,2,95,4,106,6,95,2,106,8,150,2,142,
2,119,4   [9E]

140 DATA 127,4,142,4,127,4,119,4,106,4,119,20,478,4,-1,-1   [DB]
```

TYPING TEST BY GILLIAN FREEMAN

Having warmed up by entering the listing, go for broke and test your speed and accuracy. For each mistake you make one second is added to your overall time.

```
10 DIM rec(6):CLS:INK 0,0:MODE 1:INK 1,26:BORDER 0:FOR j=0 TO 6:rec(j)=15:NEXT j
  [8A]

20 LOCATE 15,7:PRINT "TYPING TEST":LOCATE 8,11:PRINT "WRITTEN BY GILLIAN FREEMAN
":LOCATE 16,15:PRINT "MARCH '89":LOCATE 10,24:PRINT "PRESS ANY KEY TO GO ON":CAL
L &BB18:CLS:LOCATE 5,9:PRINT "TYPE EACH SENTENCE AS ACCURATELY":LOCATE 8,10:PRIN
T "AND AS" [B6]

30 LOCATE 15,10:PRINT "QUICKLY AS POSSIBLE":LOCATE 14,24:PRINT "PRESS ANY KEY":L
OCATE 6,16:PRINT "EACH ERROR COSTS YOU ONE SECOND":CALL &BB18 [E4]

40 CLS:d=INT(RND*5):RESTORE 90:FOR i=0 TO d:READ a$:NEXT i:LOCATE 3,1:PRINT a$:s
=i:t=TIME:INPUT b$:tt=TIME:mistake=0:FOR i=0 TO LEN(b$)-1:IF MID$(a$,i+1,1)<>MID
$(b$,i+1,1) THEN mistake=mistake+1 [C4]

50 NEXT I:IF LEN(b$)<LEN(a$) THEN mistake=mistake+(LEN(a$)-LEN(b$)) [24]

60 IF LEN(b$)>LEN(a$) THEN mistake=mistake+(LEN(b$)-LEN(a$)) [59]

70 timer=INT(((tt-t)/300)*100)/100+mistake:IF timer<rec(s) THEN rec(s)=timer:PRI
NT:PRINT "Congratulations! You have broken the    record." [77]

80 PRINT "It took you";timer;"seconds and you made";mistake;"errors." [A2]

90 DATA "Amstrad Computer User is great!","Many Hands Make Light Work","Too Many
 Cooks Spoil the Broth","Two Heads Are Better Than One","Every Cloud Has A Silve
r Lining","A Stitch In Time Saves Nine","A Rolling Stone Gathers No Moss" [E7]

100 PRINT "Press any key to play again":CALL &BB18:GOTO 40 [E4]
```

RIPPLE
BY MARTIN BUHMANN

When run, this program causes a rippling wave to move down the screen. This kind of effect is also common on television sets just before they die.

```
1 MODE 0:RANDOMIZE TIME:INK 0,0:PAPER 0:BORDER 0:MEMORY 29999:FOR addr=&7530 TO &7588:READ p$:p=VAL("&"+p$):check=check+p:POKE addr,p:NEXT:IF check<>10119 THEN PRINT "Fejl i kode.":END ELSE CALL 30000  [E9]

2 DATA 01,3E,75,21,3A,75,CD,D1,BC,C9 [51]

3 DATA 00,00,00,00,85,75,18,00,DD,E5 [F0]

4 DATA F5,C5,D5,E5,01,00,BC,3E,02,ED [EA]

5 DATA 79,01,00,BD,3E,2E,ED,79,CD,71 [E5]

6 DATA 75,01,00,BC,3E,02,ED,79,01,00 [AE]

7 DATA BD,3E,2F,ED,79,CD,1B,BB,38,12 [A4]

8 DATA CD,71,75,18,D7,DD,46,01,DD,4E [58]

9 DATA 00,0B,3E,00,B8,20,FA,C9,E1,D1,C1,F1,DD,E1,C9,42,49,C6,00 [C2]

10 DEF FN pn=INT(RND*14)+1:DEF FN pf=INT(RND*26):FOR c=1 TO 25:LOCATE 5,c:a=FN pn:b=FN pf:INK a,b:PEN a:PRINT "A":LOCATE 10,c:a=FN pn:b=FN pf:INK a,b:PEN a:PRINT "B":LOCATE 15,c:a=FN pn:b=FN pf:INK a,b:PEN a:PRINT "C":NEXT:|BIF,816:|BIF,471 [B7]
```

BIG PRINT
BY WILLIE LAWRIE

This program allows you to draw characters of any size on the screen. The variables h,w are the height and width, a = number of characters in string and b,z are the screen co-ordinates.

```
10 MODE 1:BORDER 0:INK 0,0:INK 1,26:INK 2,0:DEFINT a-z:TAG:a=19:b=8 [75]

20 h=2:w=2:z=360:PLOT 1,15,2:PRINT"A B C D E F G H I J";:GOSUB 70 [4D]

30 h=3:w=2:z=276:PLOT 1,15,2:PRINT"K L M N O P Q R S T";:GOSUB 70 [49]

40 h=4:w=2:z=172:PLOT 1,15,2:PRINT"U V W X Y Z 0 1 2 3";:GOSUB 70:a=5 [26]

50 h=5:w=4:z=48:PLOT 1,15,2:PRINT"45678";:GOSUB 70:a=3:b=350 [22]

60 h=9:w=6:z=18:PLOT 1,15,2:PRINT"(9)";:GOSUB 70:CALL &BB18:END [63]

70 FOR x=0 TO 16*a:FOR y=1 TO 16 [9F]

80 IF TEST(x,y)=0 THEN 100 [FB]

90 PLOT (x*w)+b,(y*h)+z,1:PLOT (x*w)+b,(y*h)+(z-2) [05]

100 NEXT y:NEXT x:RETURN [B0]
```

TEMPERATURE BY DANIEL TANKOWSKI

Enter the temperature in any of the three formats and it will be converted instantly to the other two.

```
10 SYMBOL AFTER 95:SYMBOL 96,&E0,&A0,&E0,&0,&0,&0,&0,&0:SPEED INK 30,30:MODE 1:B
ORDER 6:INK 0,6:INK 1,2:PRINT "Temperature Converter (DJ 1989)":INPUT "Unit of m
easurement:                    (C)elsius,(F)arenheit or (K)elvin";t$:INPUT "Temp
erature";t   [1B]

20 t$=UPPER$(t$):IF RIGHT$(t$,1)="C" THEN GOTO 30 ELSE IF RIGHT$(t$,1)="F" THEN
GOTO 40 ELSE IF RIGHT$(t$,1)="K"THEN GOTO 50 ELSE GOTO 90:GOTO 70    [BD]

30 IF t<-273.15 THEN GOTO 60 ELSE PRINT"Temperature conversions...":PRINT t "`C"
:PRINT (9*t)/5+32 "`F":PRINT t+273.15 "`K":GOTO 70    [FB]

40 IF t<-459.67 THEN GOTO 60 ELSE PRINT"Temperature conversions...":PRINT (t-32)
*5/9 "`C":PRINT t "`F":PRINT (t-32)*(5/9)+273.15 "`K":GOTO 70    [4F]

50 IF t<0 THEN GOTO 60 ELSE PRINT "Temperature conversions...":PRINT t-273.15 "`
C":PRINT t-273.15*9/5+32 "`F":PRINT t "`K":GOTO 70    [8A]

60 CLS:INK 1,24:LOCATE 1,13:PRINT"Error:Temperature out of range
Minimum permitted ranges:                                    -273.15`C
                        -459.67`F                            +000.00`K":GOTO
 100    [8E]

70 PRINT:PRINT"     ***Press SPACE to continue***"   [8D]

80 a$=INKEY$:IF a$="" THEN GOTO 80 ELSE RUN [01]

90 CLS:INK 1,24:LOCATE 1,13:PRINT"Error:Unknown unit of measurement
Permitted units:                                    (C)elsius
            (F)arenheit                             (K)elvin" [B8]

100 PRINT "       Please try again":GOTO 70 [0F]
```

SELECTION SORT BY WILLIE LAWRIE

This ultra fast sorting routine has been slowed and animated to give you an idea of its workings.

```
10 MODE 0:BORDER 2:INK 0,0:INK 1,26:WINDOW#1,7,20,6,16:WINDOW SWAP 0,1:s$=STRING
$(10,32):x=2:m=10:FOR a=1 TO m:b=INT(RND(1)*900)+100:n$(a)=MID$(STR$(b),2):LOCAT
E x,a:PRINT n$(a):NEXT [93]

20 LOCATE 6,10:PRINT CHR$(242):CALL &BB18:z=m:FOR j=1 TO (m-1):p=j:FOR k=(j+1) T
O m:h=m+j-k+1:IF n$(j)>=n$(h) THEN 30 ELSE IF n$(h)>n$(p) THEN p=h [AD]

30 NEXT k:IF j<>p THEN h=p:GOSUB 50 ELSE 40 [1A]

40 NEXT j:LOCATE 6,10:PRINT CHR$(224):CALL &BB18:RUN [14]

50 IF z=h THEN 60 ELSE IF h>z THEN st=1 ELSE st=-1:FOR y=m+st TO h STEP st:LOCAT
E 6,y-st:PRINT CHR$(242):e=300:GOSUB 100:LOCATE 5,y-st:PRINT s$:NEXT AF]

60 FOR x=1 TO 4:LOCATE 1,h:PRINT LEFT$(s$,x)+n$(h)+CHR$(32)+CHR$(243):e=70:GOSUB
 100:NEXT:FOR y=h TO j STEP -1:LOCATE 5,y:PRINT n$(h)+CHR$(32)+CHR$(240):e=300:G
OSUB 100:LOCATE 5,y:PRINT s$:NEXT [2A]

70 FOR x=4 TO 1 STEP -1:LOCATE 2,j:PRINT LEFT$(n$(j),x)+n$(h)+CHR$(32)+CHR$(242)
+CHR$(32):e=70:GOSUB 100:NEXT:FOR x=1 TO 4:LOCATE 2,j:PRINT LEFT$(n$(h),x)+n$(j)
+CHR$(32)+CHR$(243):GOSUB 100:NEXT [01]

80 FOR y=j+1 TO h:LOCATE 5,y-1:PRINT s$:LOCATE 5,y:PRINT n$(j)+CHR$(32)+CHR$(241
):e=300:GOSUB 100:NEXT:FOR x=4 TO 1 STEP -1:LOCATE 1,h [FD]

90 PRINT LEFT$(s$,x)+n$(j)+CHR$(32)+CHR$(242)+CHR$(32):e=70:GOSUB 100:NEXT:LOCAT
E 5,h:PRINT s$:z=h:t$=n$(h):n$(h)=n$(j):n$(j)=t$:RETURN [AA]

100 FOR d=1 TO e:NEXT:RETURN [8D]
```

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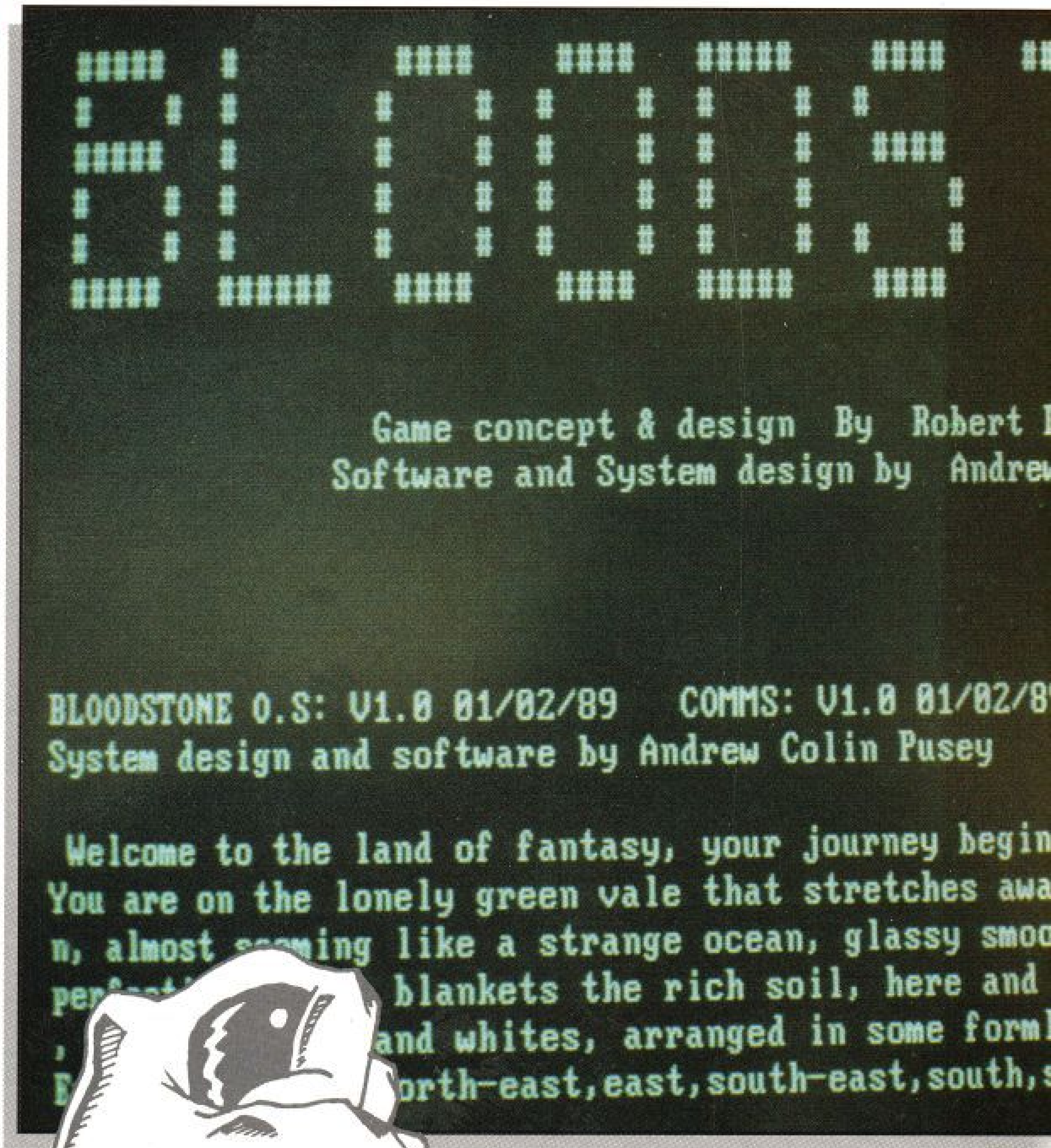
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A world of adventure awaits on the other side of your modem.

Some lands of fantasy contain nothing but frustration as the limits are due to the game and not your imagination, not so Bloodstone.

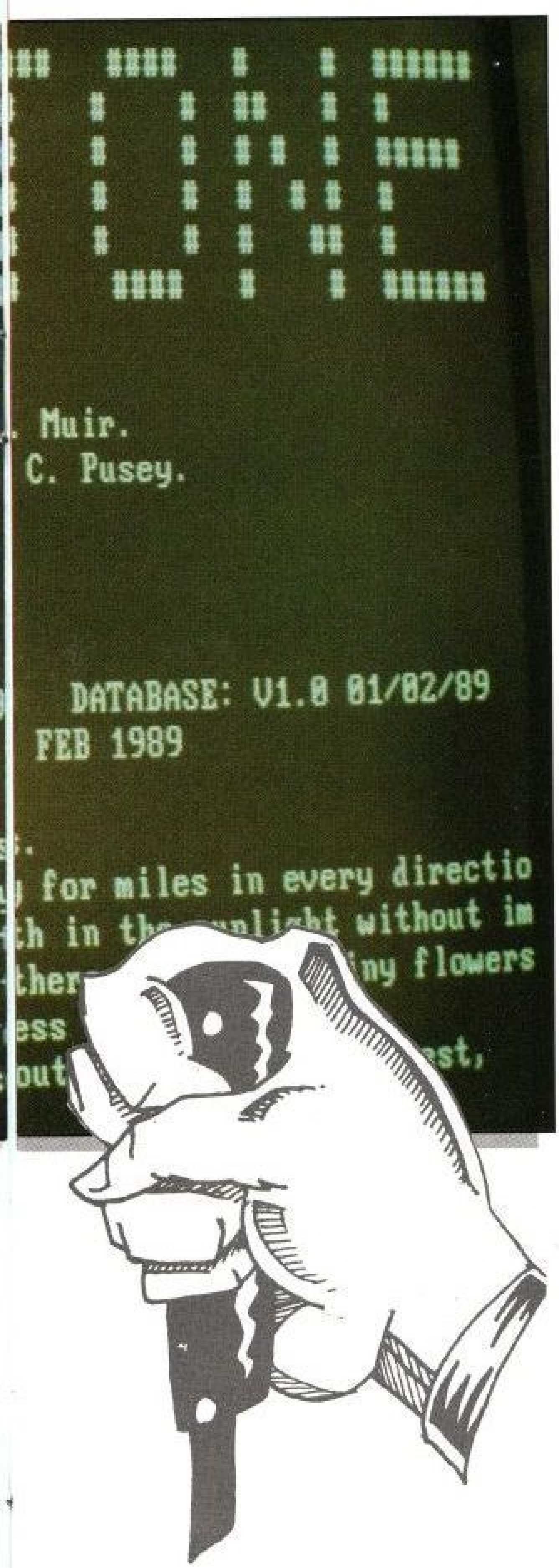




"A word to the wise – the game checks for structural integrity so do not be too surprised if you knock down a supporting wall and the buiding falls on your head."

As the pressures of the world mount, more and more people are seeking a way out of the rat race. Many find release in alter-egos who rampage across foreign lands seeking fame and glory. Via the modem is one way to reach these strange lands and meet fellow travellers but these worlds have always had their limitations – or at least they had.

By looking at the development of adventure games you can see some of the things for which multi-user games have been aiming, but *Bloodstone* not only achieves those goals but far surpasses them. The idea of computer-controlled mobiles



has been expanded to include even greater flexibility and levels of intelligence and the way in which the world is constructed offers some startling innovations.

Unlike games of that ilk, Bloodstone does not treat the environment as a series of inter-connected squares but represents it digitally through the use of fractal programming techniques. This allows a greater freedom of choice, allowing the player to manipulate not only the obvious but the less apparent features found previously only in real life.

Bloodstone resulted because Robert Muir found present multi-user games too limiting. Conventional technology proved incapable of holding the dream, with the possible exception of the Cray series, but those machines were a little over-priced for their needs. So a new breed of machine came into being incorporating transputers and a Unix system. More details are refused as the design is being patented with hopes of leasing the technology to other interested parties.

The finance for the project came from computer recruitment manager Tony Cox. Although the initial outlay for the system was in the tens of thousands it is hoped to make the money within three months of going operational. There is confidence that the product will sell. Along with Andrew Pusey who helped with the development, the three hope to blaze a trail others will try in vain to follow.

What makes this game stand out from the crowd is the amount of control the player has over the environment. If a player wanted to move north but a wall blocked the way, if sufficient force could be applied the wall could be breached. A word to the wise – the game checks for structural integrity, so do not be too surprised if you knock down a supporting wall and the building falls on your head.

The ability to alter the landscape also extends to the ground, which goes down seven levels, and the sky, which goes up more than 15 levels. Changing the landscape must be done with caution, however, as the game does not re-set. This means that any changes you make stay that way until another character changes them again.

To complete the reality of the environment the game also includes a simulated weather system. Water evaporates from the seas and condenses to form clouds. It then rains and each raindrop is a 3D object which interacts with the landscape as normal water would. This weather system even includes wind which acts on the objects and characters in the game.

The characters are in many guises and with the system able to support millions of characters the details have not been spared. If, for instance, you fell victim to a polymorph spell and found your stature somewhat reduced it would be feasible to interact with the insect lifeforms, some of which may even be other players. The mobiles are designed to think like living beings and follow you into battle. You could even head an army challenge the might of kings if you desire.

One of the more notable advances is the handling of objects. Each object is three-dimensional and comprises several other parts. The parts are joined with links which can be broken when sufficient force is applied. This means you can take things to pieces or break them. The human form contains more than 140 such pieces, so it is possible to lose anything from the tip of your finger to your leg, though I understand that certain necromancers deal in new limbs.

When leaving the game your character becomes a mobile which you can program. There are a few places where a character can be left safely while off-line but if you wish to go on holiday for a few weeks and do not trust the mobile version of your character you can wait the 20-odd minutes it takes a demon to drag you off to limbo.

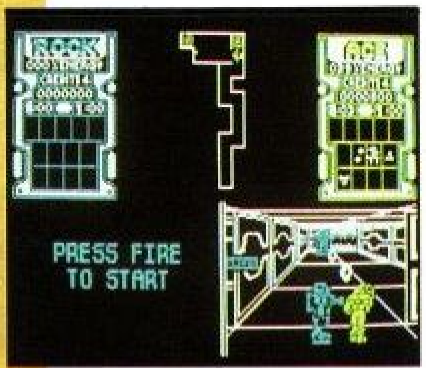
Because of the flexibility of the system there is very little a player cannot do.

Initially the playing area will be confined to a single county with two castles but as the players gain experience and everybody learns more about the system new realms will be discovered.

There is more to this hardware than playing multi-user games. Plans include conferencing facilities in specially-constructed models and an executive version of the game where there are no limitations. Bloodstone is the future today.

This month we are delving into the depths of deep, dark and dank dungeons with the latest Mirrorsoft underground, all-action adventure *Bloodwych*. Also this month you have the chance to blast away with *Silkworm* and bounce on heads with the *Ninja Commando.*

GAMEPLAN



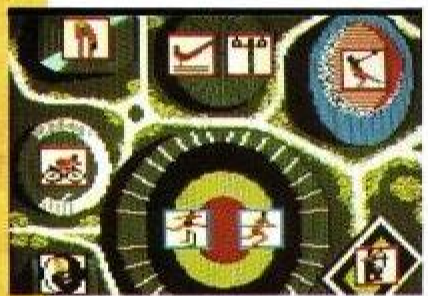
XYBOTS

3D maze action as one or two players blast their way through this arcade conversion.



RICK DANGEROUS

Help Rick collect the lost treasures. A little help is also needed when avoiding the traps and angry natives.



SUMMER GAMES

It is Olympic time again. Stock up on linament and warm up your joystick.

PLUS

3D Pool, Times of Lore, Super Scramble Simulator and Microprose Soccer.

TOP 20

1	(2)	Robocop	Ocean
2	(NE)	Postman Pat	Alternative
3	(NE)	Bomb Jack 2	Encore
4	(NE)	1942	Encore
5	(NE)	Rambo	Hit Squad
6	(NE)	Emlyn Hughes Int. Soccer	Audiogenic
7	(3)	Twin Turbo V8	Code Masters
8	(NE)	Enduro Racer	Hit Squad
9	(NE)	Daley Thompsons Decathlon	Hit Squad
10	(1)	Fast Food	Code Masters
11	(5)	Turbo Esprit	Encore
12	(4)	Treasure Island Dizzy	Code Masters
13	(NE)	European 2	E & J Software
14	(NE)	Grand Prix Simulator 2	Code Masters
15	(6)	Spy Hunter	Kixx
16	(NE)	Arcade Flight Simulator	Code Masters
17	(NE)	Yogi Bear	Alternative
18	(NE)	Road Runner	Kixx
19	(NE)	Microprose Soccer	Microprose
20	(18)	Crazy Cars 2	Titus

Last week's position in brackets
Top 20 compiled by Gallup

XYBOTS

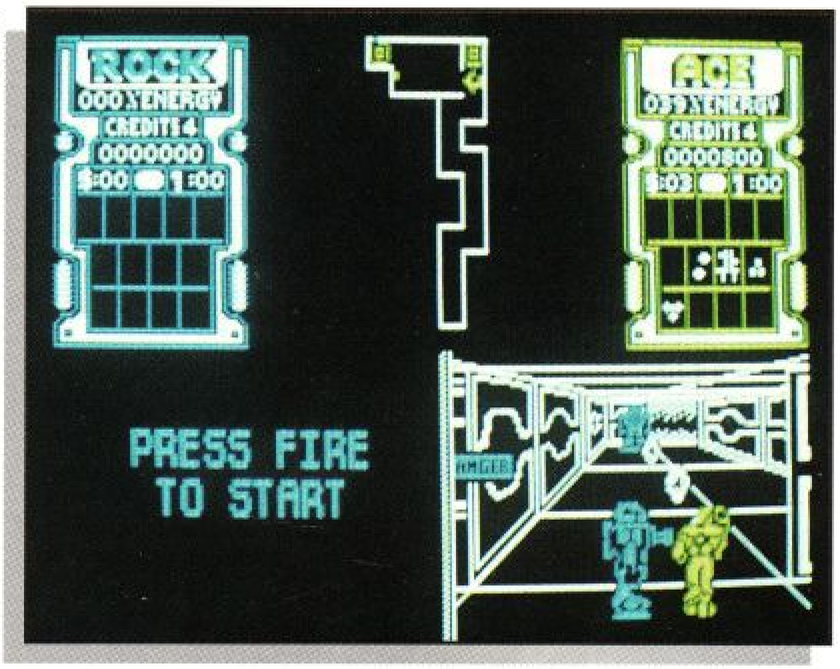
Eee, when ar werra lad, yer 'ero like, 'ad names like, Buck Rogers and Dick Tracy. These days yer get big girly 'eros like Kurt Eos and Richard Politely. Thank 'eavens fer yer arcade convershun from Domark then? Back t'good old days, takin' part a' Major Rock Hardy and Captain Ace Gunn as they penetrate yer *Xybots* underground complex and rub out yer Master Xybot.

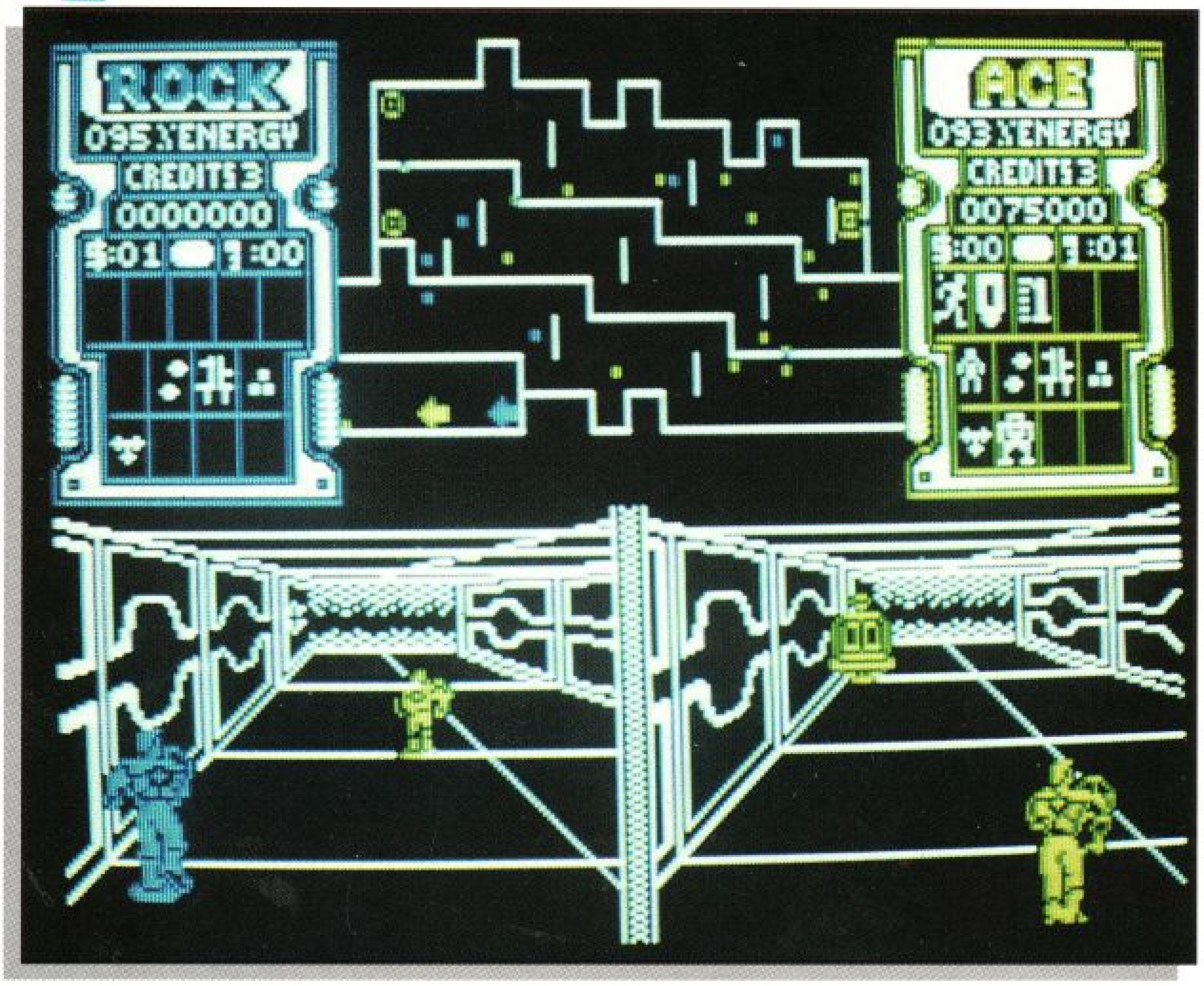
Alas, the return of corn is not the only dated approach in this conversion of the Tengen arcade game. Xybots is essentially a 3D maze game with shooting, whose only real claim to worthiness is the provision of a simultaneous two-player option, with each hero having his own independent screen. Needless to say they are not very big but, more disappointing, Spectrum graphics have been employed so it is a spot-the colour contest. Even where colour has been employed it is one shade to each object.

That makes me angry. The Amstrad has the best colour graphics of any 8-bit home computer so if I had have wanted poor graphics I would have bought a Spectrum.

Enough of the ranting. The object is to progress through each level, killing Xybots along the way, occasionally taking out a Master Xybot or being sent back a few levels while collecting spinning coins.

The coins can be used to buy snazzy weapons, enemy mappers and other supplies. You are armed with a Zapper besides your standard laser, which freezes the enemy temporarily. At the supply depot, which is available only at the end of every level, you can upgrade the Zapper to make it capable of blowing away Xybots.





The control and display are peculiar. Although you are looking in 3D, it is split into, say, 10ft. sections in which you can move round and objects can be collected. If you move forward far enough and you look like a pregnant duck waddling around, you enter the next section and the display is re-drawn, showing you in the new location, with enemies closer than they were.

On the arcade machine you had a twistable top on the joystick so that you could turn round while still moving round your section normally. On the CPC it is done by holding down the fire button then moving the joystick. Of course, as soon as you release you start shooting but at least the system works on the CPC, which is more than can be said for the ST version.

The sound effects accompanying the shooting are routine and add nothing to the atmosphere or enjoyment but there is not much enjoyment in this graphically weak, interminably dull coin-op conversion.

Mark Luckham

ROUND-UP

NAME	Xybots		
SUPPLIER	Domark	PRICE	£9.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

" If I had wanted poor graphics I would have bought a spectrum. "



Silkworm

The worm that turned

After four nuclear wars, those weapons of total destruction were outlawed from the Earth, as the planet wobbled along on a precarious orbit round the Sun. Unknown to the leaders of the One Continent Alliance, the generals of the army were not happy having to make do with fast rate. high explosive, non-nuclear weapons and set to plotting treachery.

Rebellion erupted later and the government stared in horror as the combined armed forces bore down on them. A hasty plan, nay a desperate plan, was conceived to save civilisation from another, inevitable, and fatal use of nuclear weapons.

Take command of the latest helicopter, or even a rugged, weapon-wielding jeep, and plough through the armed ranks, blasting, killing, shooting, destroying, wrecking, in search of the general at the end. Only by killing all the generals can the day be saved.

When confronted with the options menu, make sure you pick the correct options because you never go back to that screen and have to reload if you want to do so. To switch from one to two-player mode you must reload – stupid is putting it mildly.

Even though the jeep is armed with a cannon which can be rotated through 180 degrees so that it can fire backwards, it is still very difficult to survive in it. Landmines and tanks are your two main worries, with the end-of-level choppers and tanks being the most vicious.

A small-sized playing area scrolls in from the right, with a parallax effect from the landscape and a starfield. Wave after wave of enemy choppers stream in spewing lead, while gun emplacements along the ground throw missiles into the atmosphere like confetti at a wedding.

Life in the chopper is much easier than the jeep but you are a larger target and the sprite detection is not so good as it should be, making life none too easy.

If you shoot a landmine it releases a cloud of plasma into the atmosphere, which can be collected to provide a temporary shield, or shot to produce a smart-bomb-like explosion. Further aids to the cause can be created and collected by shooting a goose-like aircraft which you can cook only by hitting it in the neck. Once well done, it reveals score bonuses and, more important, double firepower icons for both players.

Once you get into that blasting groove, with lead flying and the enemy dying, you can almost believe this is a good game. Then something tough and nasty requires you to move and you remember how desperately laborious it is.

Like some kind of nightmare it all happens in slow motion. The huge missile approaching relentlessly, your chopper seeming to move through glue, the distressing loss of your final life, and then the horrible realisation that unlike the ST and Amiga versions you have to return to the beginning again.

Sonics which lack variety and impact accompany action which only just gets above turgid, in a small playing area with little thought having been expended on the options, and you have just paid for the worst version of what was a good game. Very disappointing.

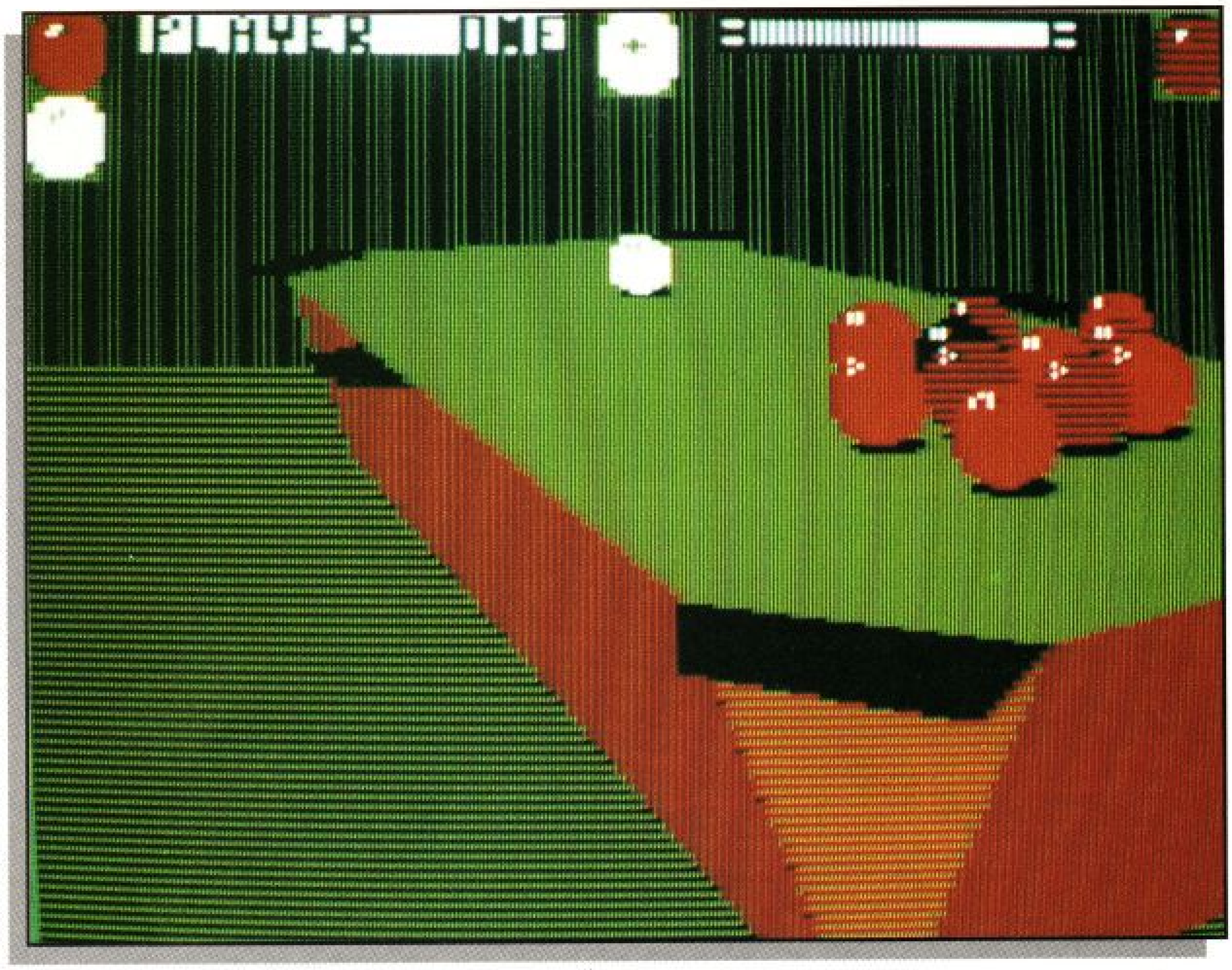
Mark Luckham



ROUND-UP

NAME	Silkworm		
SUPPLIER	Virgin	PRICE	£9.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

"Only by killing all the generals can the day be saved."



3D POOL 3D POOL 3D POOL 3D POOL 3D POOL

Flash Harry, No Good Nik, Mighty Mike and Billy T kid await your challenge.



If you saw *The Hustler* or *The Color of Money* you will know what pool tournaments are about. Paul Newman, Tom Cruise, a smoky atmosphere, shady figures moodily chalking cues, the crack of a sledge-hammer break, the rumble of balls disappearing into pockets. If you were expecting this kind of thing from *Maltese Joe's 3D Pool Challenge* from Firebird prepare to be disappointed.

The aim is to battle your way through a tournament against the computer which faces you in a series of guises such as Flash Harry, No Good Nik, Mighty Mike and Billy T Kid. You have to beat each in a best of three games before meeting Maltese Joe in the final. The players become progressively more difficult; I never had the privilege of meeting Maltese Joe, so was unable to gauge his skill, which I imagine must be considerable. The computer is difficult to beat even in the easier stages, seldom making mistakes or giving away easy shots.

The game operates by the player moving round a table, rendered in graphics of a crudity remarkable even by CPC standards, lining the cue ball, the target ball and a 'reference' ball at the top of the screen before shooting. The instructions offer refinements like swerve and spin shots which, as far as I could determine, are figments of the programmer's imagination.

The game lacks atmosphere and drama, the sound effects are minimal and the screen has little detail. There will not be many people with the patience and skill to see the tournament through in its entirety.

The best feature is the 3D effect which allows the player to move round the table viewing it from every angle and every height. This feature is easy to use and very useful when lining up a shot. Worthy though it is, it suffers from being the only note of realism in an otherwise fairly flat game.

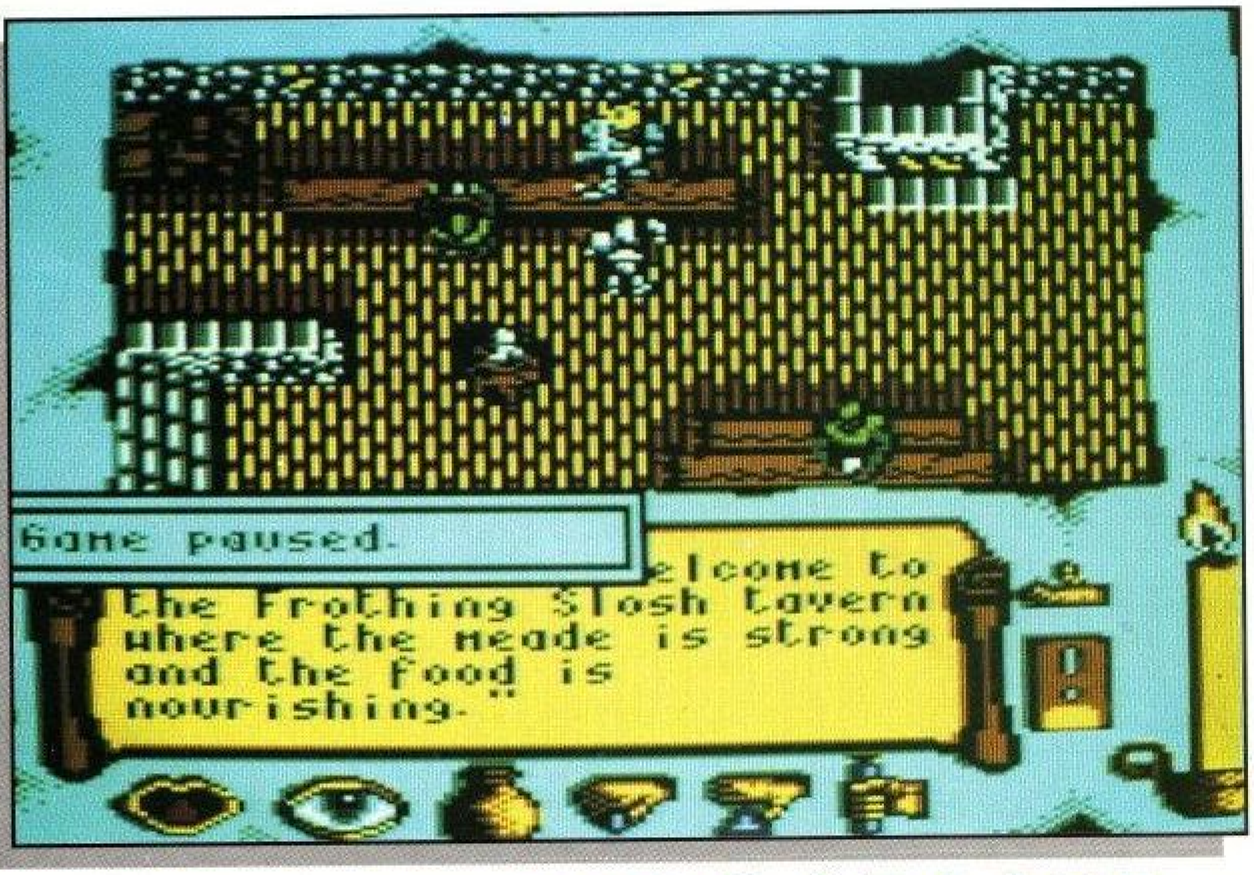
Perhaps Maltese Joe's 3D Pool Challenge possesses subtleties which were oblivious to me but it probably does not. When I next sit at my Amstrad to do some shooting I hope it is aliens, tanks, spiders, baddies, bricks, or almost anything so long as it is not pool; I will save that for the pub.

Guy Matthews

ROUND-UP

NAME	3D Pool		
SUPPLIER	Firebird	PRICE	£9.99/£14.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

If you saw The Hustler or The Color of Money . . . prepare to be disappointed

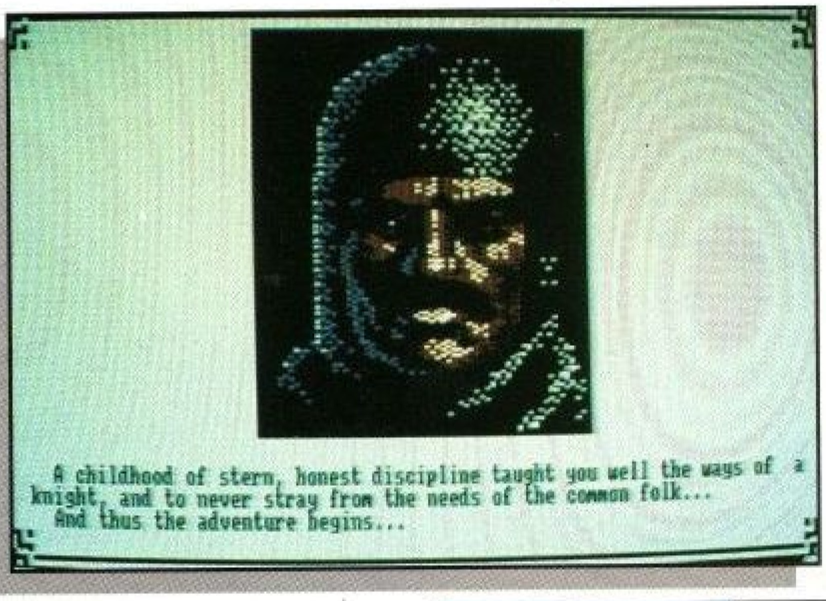


TIMES OF LORE

The Kingdom of Albereth is the outpost of the Elden people, whose homeland lies across the sea. Born within this kingdom chaos now stirs the land. This is the *Times of Lore* and consequently times of utter pandemonium with the mystic powers of old gradually fading away. The reason for this sudden mayhem in what once seemed to be a sleepy backwater is that the High King Valwyn has failed to return from the homelands of the Elden folk, where he had taken refuge to regain his strength following the Severn War.

With numerous, unethical brigands roaming the roads and the barbarians pressing hard on the kingdom, you have your work cut out to fulfil some unlikely missions in strange and distant places. As either a knight of unfailing courage or a Valkyrie, both strong and beautiful, or a barbarian of matchless might, you can help restore the land by retrieving various magical items from the clues given through the rumours. The rumours are obtained from small-talk conversations with guards, peasants, innkeepers and travellers.

Continuous travelling and fighting weakens you, as the candle on the screen indicates. It is therefore advisable to spend time recovering by taking a bed in an inn and stocking provisions. There is a variety of command options which allow you to talk, examine, drop, take, use and offer, as well as the constant ability to beat any opposition to pulp.



The game offers a vast amount of screen locations which adds to the interest, including transitions between town and country and a coastal scene to a desert environment. A map is provided, with the package helping you to plan your outing in advance.

Once a decision has been made to ramble the country in search of treasure and magical items, a trip round the city is always recommended so that the player can collect potions and bags of gold and become accustomed to the surroundings. It is advisible to try the potions you pick up as they are invariably good for the strength, although the best way to recuperate is between the breezy walls of the local inn, safely tucked-up on homely bed springs.

The playing screen is divided into a viewing window where your character is always shown in the centre and a command screen which provides you with the options. The candle is also situated there and burns out slowly as the character loses strength through lack of food or general fatigue.

The graphics are good to a certain extent but become a little frustrating when at times it is difficult to differentiate between some of the characters, although the ghosts and slime stand out from the crowd. Perhaps with a little more familiarisation this problem could be eradicated.

Times of Lore is a large game which can be saved in stages and with 1,300 screen locations promises to hold the attention of those with a mind for arcade-like, classic adventures.

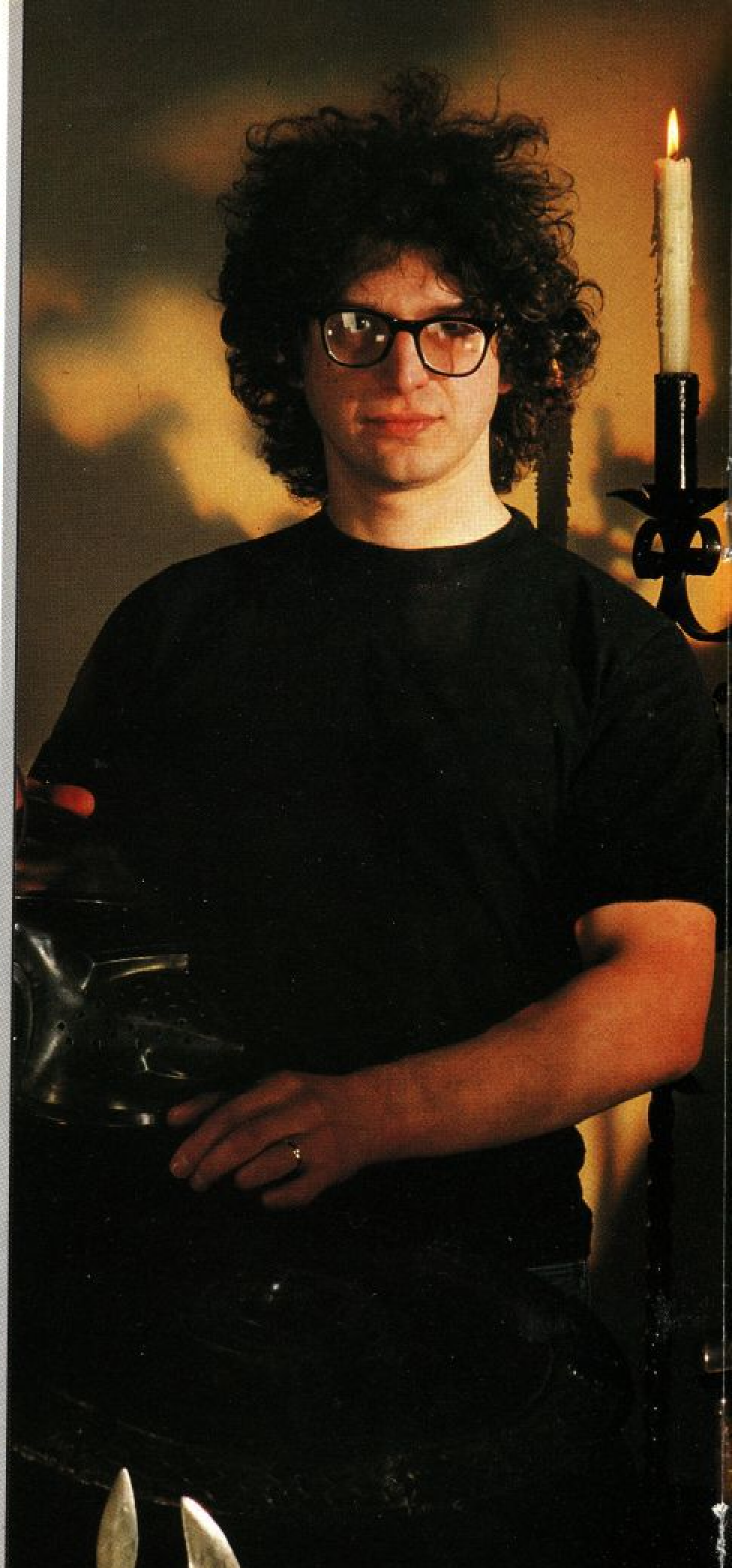
Marc Jones

ROUND-UP

NAME	Times of Lore		
SUPPLIER	Origin	**PRICE**	£12.95
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

"With numerous, unethical brigands roaming the roads and barbarians pressing hard."





BLOODWYCH

For many people, the 16-bit program of 1988 was *Dungeon Master*, which made a giant leap forward in fantasy role-playing games by making all the action happen in real-time 3-D, with manipulable scenery. All well and good but surely only of cursory interest to Amstrad owners?

Well, perhaps not, because the software house responsible for bringing Dungeon Master to the U.K. has signed Starlight Software and its fantasy game *Bloodwych*.

Starlight consists of Anthony Taglione and Pete James, whose previous efforts included the *Red L.E.D. and Deathscape*, not really the record which inspires confidence in what is essentially a Dungeon Master-style game but with a split screen and two independent parties. Surprisingly they have pulled it off and produced what must be the best fantasy game ever for the CPC, if not the 8-bit program of the year – it is being programmed on all formats.

Bloodwych is set in the meandering tunnels of a large castle which contains the power to cleanse the world of all evil or plunge it into a nightmare world of depravity and horror. Four crystals hold the key to creating the spell which can be used for good or evil and they are scattered round the labarythine, secreted in naughty little places which are difficult to find. In pursuit of the crystals you will have to contend with a great range of humans who may or may not assist you and a plethora of foul beasties, all bent on your death and consumption, as well as mysterious artefacts and tricky puzzles.

You start with only one party member each if you are playing a two-player game but have room to add another three and the sooner you get them the safer you are. The interaction with other denizens of the castle is a major part of Bloodwych as you get them to join your party if you flatter them sufficiently. This aspect of the game goes far beyond anything Dungeon Master provided and is very welcome for me as I am tired of hacking everything which gets in the way.

Recruiting party members invariably involves introducing yourself, a smattering of boasting – after all who would join a bunch who explained their inadequacies from the start and a prodigious helping of flattery. It is all done under the communications menu which caters for insults and threats as well as bribing people. Even if you do not get them to join, or if you do not want them to, you will need to extract valuable information before the quest can be completed. Talk first is the idea.

Having done that, having milked them for all their worth, you are free to waste them. When playing the two-player game this despicable tactic is ever so good. Dead men cannot talk after all, especially not to the other player.

Each character has stats and a level, which increase with experience, as well as an ability to use magic. There are four basic character classes and divisions of magic user, which are colour-coded. It is best to get at least one person of each colour in your party, unless you fancy taking a party of Conans or one of Gandalfs.

The spells appear as writings

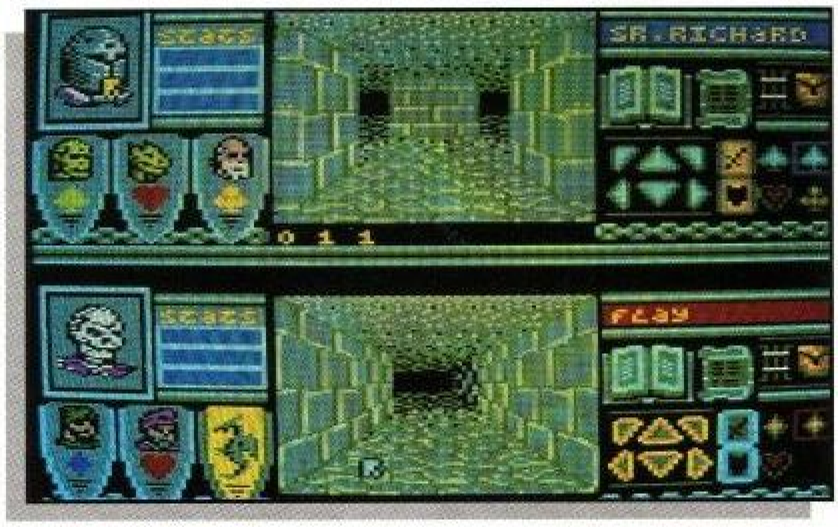


in a book and can be selected by turning the pages. Although each spell has a basic cost and a percentage change of being cast which is represented by a bar, it can be pumped up to cause more damage, to last longer or affect a wider area. Although a party of thugs may seem like a good idea it is essential to have one good magic user in the party, because if you have not and the other player has you will suffer.

The action takes place in real-time 3D with each player, if two are playing, having his own display, one above the other. Control is via the joystick and keyboard, which are used to manipulate a pointer which selects the movement icons and all the other functions. Like Dungeon Master, you can interact with the scenery by pointing and clicking to activate buttons, locks, and to collect things, though you cannot throw things and see them vanish into the distance.

When you get into a flight, just click on the flight icon and everyone will wade in, giving you the time to select spells and prepare to cast them. You can also control the amount of autonomy in the characters by commending them.

Though being a fine game as a one-player experience. Bloodwych really comes into its own when there are two of you round the CPC, as you can either co-operate, ignore, or go for each other's throats as you explore the castle depths. Particularly nasty is the spell which sends a bolt of power along corridors, bouncing off the walls. If you get the other player in a section of tunnel with no branches, and no magic with which to counter, it can be horribly funny, though you might have one friend fewer at the end of the evening.



A few words of glowing praise and they start to become cocky, launching attacks of their own. That can be counter-productive, so if you want to subdue them you have to tick them off and they almost sulk.

Scattered round the walls are tapestries which can either be merely decorative or contain vital messages and clues. The artefacts, weapons and the like are all there to be collected and it is essential that you collect them to progress without tears.

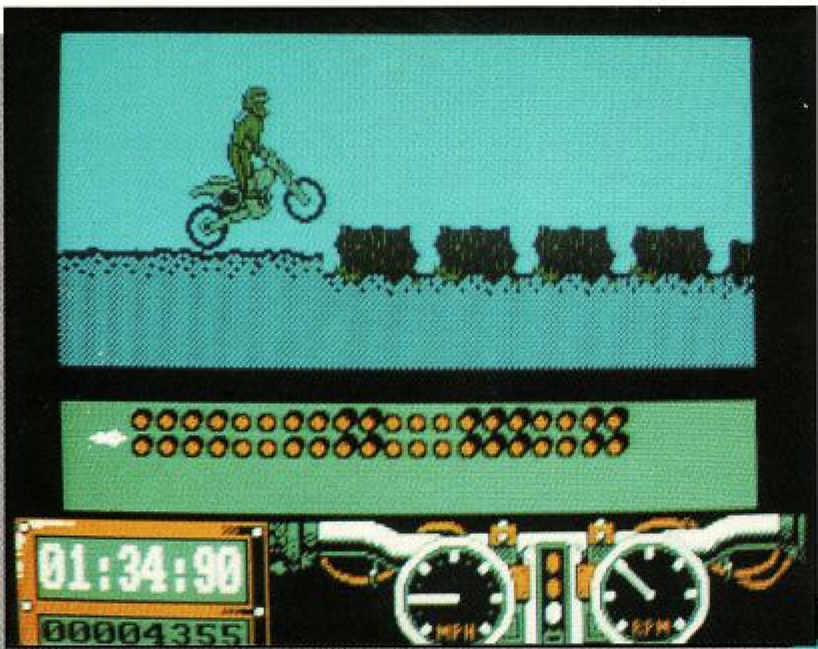
Bloodwych is an excellent game with truly excellent graphics, grey and green dungeon walls, and shows up most other CPC games for being the shallow garbage they are. If you want a game which lets you and a friend go adventuring together, if you want regular excitement and extra helpings of fun you are in the proper dungeon. Now, if you will excuse me, I have a particularly verbose character to assassinate.

Mark Luckham

ROUND-UP

NAME	Bloodwych		
SUPPLIER	Mirror Soft	PRICE	£9.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

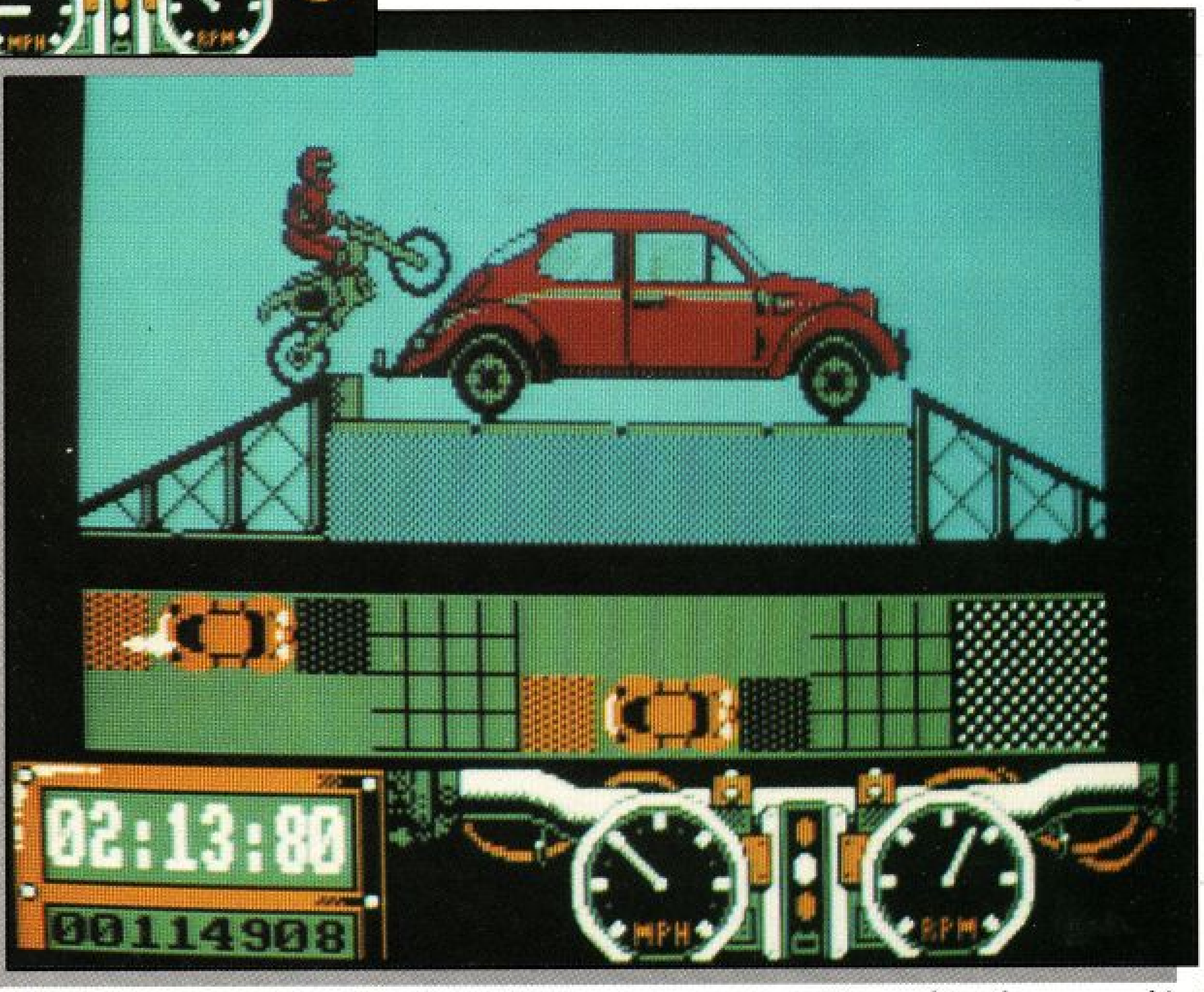
"Bloodwych is an excellent game with truly excellent graphics."



ROUND-UP

NAME	Super Scramble Simulator
SUPPLIER	Gremlin
PRICE	£9.99/£14.99
GRAFFIX	
SONIX	
PLAYABILITY	
OVERALL	

Sadly the game does not match the real thing it claims to simulate.



Super Scamble Simulator

Getting on the bike is easy staying on is not.

Most of us have watched at least one motorbike scramble. Many of us may have wished we could participate. We know it is not so easy as it looks; we know it is a very expensive hobby, yet the small boy within us always hankers for that chance.

It was thus with excitement that I loaded the new release from Gremlin, the *Super Scramble Simulator*. This real-life simulator lets you tackle 15 gruelling terrains, over dirt tracks, up hills, through water and even over cars and lorries.

Sadly the game does not match the real thing it claims to simulate. Starting over a blue dirt track the course is soon mastered. Having discovered how to rev the engine and move into first gear the job is largely done. Keeping at full speed in bottom gear the job is largely done. Keeping at full speed in bottom gear takes you safely over the whole course except for one tricky obstacle at the bottom of one of the hills. The time limit is large so there is no need for higher gears. The hills are very steep with a 45 percent gradient but keeping up the revs in first gear ensures you have no problems.

The obstacle is navigated with a flick of the bike while in mid-air to ensure the back wheel lands first. Control is poor; wheelies can be pulled but holding one is almost impossible. When you try to lift the back wheel you are left in the lap of the gods as to whether it will rise or not.

When things go wrong you are left feeling dissatisfied; there is no prior warning that the biker is in difficulty. There are no graphics to depict a crash; the screen freezes with a simple message "You crashed on your front wheel... Penalty 7 seconds." The off you go again, not much the wiser about the error in your ways.

The joystick controls the revs, changing gear, braking, moving left and right and the lifting of both wheels. Typical of the program is that, even if you are travelling on a straight, level piece of track, on reaching maximum speed you are given a crash message. It is very frustrating.

Perhaps there are some experts who will be able to master the crossing of the upright tree stumps; my stumbling fingers could not perform the task. I had more success crossing the rocky hillsides, the trick being to keep the speed within a very narrow range; too much and the bike crashes because of excessive speed, too little and it stalls.

Plenty of time and effort has gone into the programming of the sound and graphics but the gameplay does not match.

Steve Brazier



Rick Dangerous

Follow the antics of little Rick as he crashes aircraft and avoids death in the deep Amazon jungle.



By now you have probably all seen *Indiana Jones part 3* and I would think there are plenty who seek that kind of excitement in their lives. Cute Rick Dangerous will provide you with that excitement. He has to dodge so many traps, kill so many people and survive so many adventures. Little Rick has to cope with four adventures yet he does not need his father's help to complete any of them.

The action starts when Rick carelessly crashes his aircraft over the Amazon jungle. Having seen a band of blood-thirsty tribesmen, he manages to grab a large stick, a gun and some dynamite before he is running frantically into the unknown depths of a cavernous temple.

At that point we have to take control of our hero; the first task is to prevent Rick being splattered by a rolling boulder twice his size. From then obstacles, spikes, death traps and flying spears come thick and fast. There is an abundance of tribesman all fighting to save their society from the relentless spread of western civilisation, all wanting Rick dead.

He has to avoid contact with any of the nasties. He has many options, for he can jump or crawl, prod, shoot or lay dynamite. His amunition supply is limited; more can be discovered around the maze. Tribesmen can be killed using only the stick. Bonus icons are also about to boost one's score.

Rick, who resembles a Weetabix man, starts the game with seven more lives than Harrison Ford will ever have. Many more are needed to complete a stage. The traps are numerous and unpredictable but each trap, once beaten, is easily beaten again. The game is not boring; this fun arcade adventure has some 85 screens on 8-bit formats with an extra 50 screens on the 16-bit formats.

In a traditional platform-style game, Rick jumps gaily round the screen from ledge to ledge. On escaping the jungle, he is sent to help the British Museum to recover the priceless Jewel of Ankhel. It has been stolen by a group of fanatics who threaten to destroy it until a ransom is paid. The pyramid contains many more horrid traps; the Middle Eastern characters are far from friendly.

For the third level we become intelligence agents, beating guards, cracking security systems. Life in this castle gives Rick no time for resting.

The story ends with Rick against an army in an attempt to prevent an enemy missile attack on London. Saving London from a fate even worse than a tube strike is entirely in Rick's hands.

This is a great little game; the graphics and sound effects are simple yet good, the movements and character control are precise. It is fun from the start and the enjoyment lasts; it even managed to take me away from *Tetris* for two hours. With 74 types of traps and enemies you will have fun with this one.

Steve Brazier

ROUND-UP

NAME	Rick Dangerous		
SUPPLIER	Firebird	**PRICE**	£9.99/£14.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

"Rick, who resembles a Weetabix man, starts the game with seven more lives than Harrison Ford will ever have."



Ninja Command

Just because you are a Ninja doesn't mean you can't use a machine gun.

Why you would want to race against a clock through strange alien terrain jumping on the heads of the all too human-looking aliens I do not know – but it is fun.

After years of dedicated training, learning the mystic arts of flame, throwing star and sub-machinegun, you set forth. Your task is obscure but you dare not fail.

Initially unarmed, you must jump on the heads of three of the enemy. Doing so liberates the throwing star weapon which can be used to kill even more enemy beings. It refers to those beings as aliens in the very brief scenario but it looks to me as if the programmer and the person who wrote the material on the inlay had two different games in mind.

Through successive killing of the enemy population you can liberate more weapons in this order. The bomb – it looks suspiciously like an apple but does the job as it arcs in for destruction. The flame – this odd weapon has a range of about two millimetres but it lingers for a short time in the place it was triggered. Finally, the single-shot machine gun; it holds more prestige but proves to be just as fatal as all the other weapons.

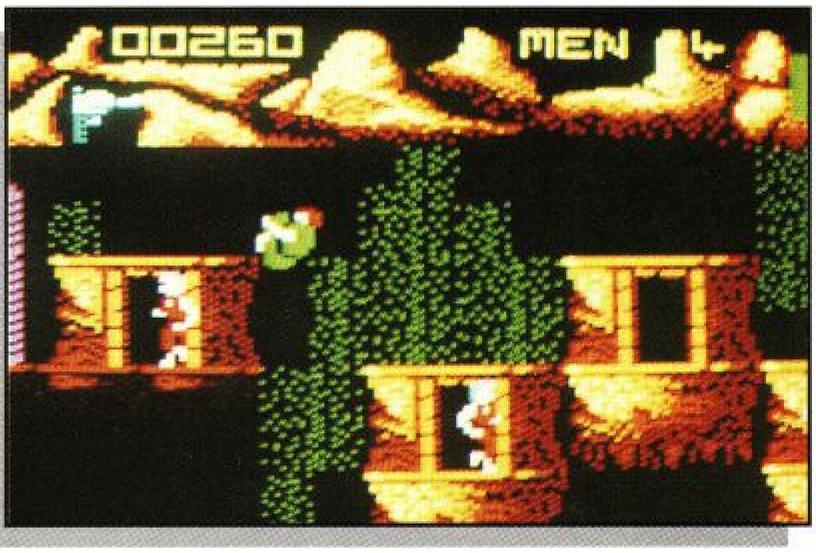
There are two ways you can lose one of your five lives. One is by falling off the platforms into the abyss. The other is contact with one of the enemy beings after they have stopped flashing. They flash just after emerging from a doorway. This all sounds fun and it is but do not be carried away as the program has a few traps for the unwary.

Over-confidence is likely to lead to the bottom of the abyss, as it is very easy to get over-excited and jump at the wrong time and find yourself plummeting. Another thing to watch for are the enemy men who crowd on rock shelves denying you access; the only solution is to jump on their heads before they stop flashing and then get out fast.

As the action scrolls along you will find that the next platform is too high for you to reach. To solve this little problem you must jump up the rock formations until you have the height you require. In your travels you will also encounter flying objects. They can be shot if you have a weapon; if not they must be avoided. You can get a nasty surprise if you do not watch your back, for occasionally a fellow ninja will appear behind you and open up with his machine gun.

With eight levels for your ninja to summersault through, this program is worth a few pounds of anybody's money. It starts easy, ensuring that even a novice player can get to grips with it. A few more sound effects or even a tune would have been pleasant.

Adrian Pumphrey



ROUND-UP

NAME	Ninja Commando		
SUPPLIER	Zeppelin Games	PRICE	£2.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

After years of dedicated training, learning the mystic art of flame, throwing star and sub-machinegun, you set forth.



The Games Summer Edition

It's almost as exhausting as the real thing.

I remember the days when games of this ilk set joystick scurrying into the dark recesses of your room. Things have progressed a little from those arm-numbing, joystick-destructing days and now the sporting simulations rely more on timing and skill than brute strength.

Set in Korea, *The Games* offers you the chance to pit your skills in eight events against five fellow players. After the opening ceremonies have concluded you choose your controls and in which events you wish to either practice or compete. To practise you go to the village where the events are displayed for your convenience.

With the exception of the velodrome cycling, all events are played individually, the winner of the event being chosen by either the shortest time, greatest distance or the most points scored. In the cycling event a split screen shows the two cyclists from behind and an overview of the track showing player positions. Waggling the joystick up and down increases the speed of the cycle and moving the joystick left and right moves it on the track. Sideways movement is used to position yourself in your opponent's slipstream.

Two of the more unusual events are the rings and uneven parallel bars. Both have diagrams which indicate where and when to move the joystick for maximum points. Following the diagrams is a little tricky but basically it boils down to a waggle here and a move there and some really graceful gymnastics occur on-screen.

Yet more waggling with the hammer thrower. The faster you waggle the faster he spins. If you manage to release the hammer so that it goes down the field the view changes. You then see the hammer travelling towards you on its world-beating journey.

The pole visit also uses the head-on view. As you see your man running towards you, you must move the joystick in time with his feet to gain speed. Once at the bar it is a question of pushing up and flicking the wrist at the correct moment. It is easy on the lesser heights but practice is needed for the greater feats.

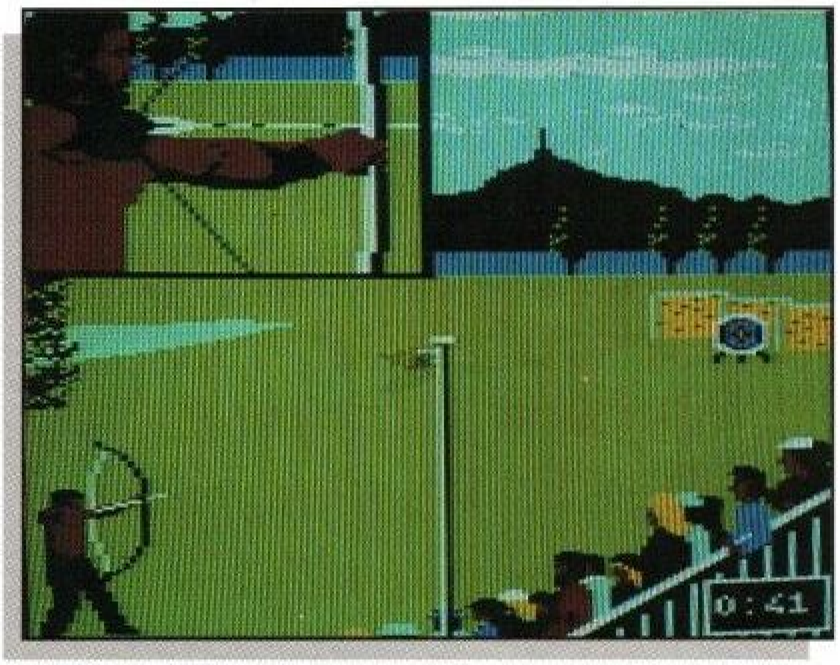
You all remember the hurdles. Waggle as fast as you can but hit the fire button to clear the obstacles. Unlike other versions of this event, hitting a hurdle puts you out of the race as you tumble headlong to the ground.

Archery is always fun, more so when there are a few rich people around to rob. After the animated sequence showing the bow being drawn, you aim the sights, add a little compensation for the wind and let fly. Three shots to achieve the world-shattering score.

Finally there is diving. As your man launches from the board you must guide him through a series of twists and turns and ensure that he enters the water smoothly. Until your diver hits the water the pool looks empty, which can be a little disconcerting.

This game will not tax your brain cells but it is well-presented and it has a few good touches here and there. A good example of its ilk.

Adrian Pumphrey



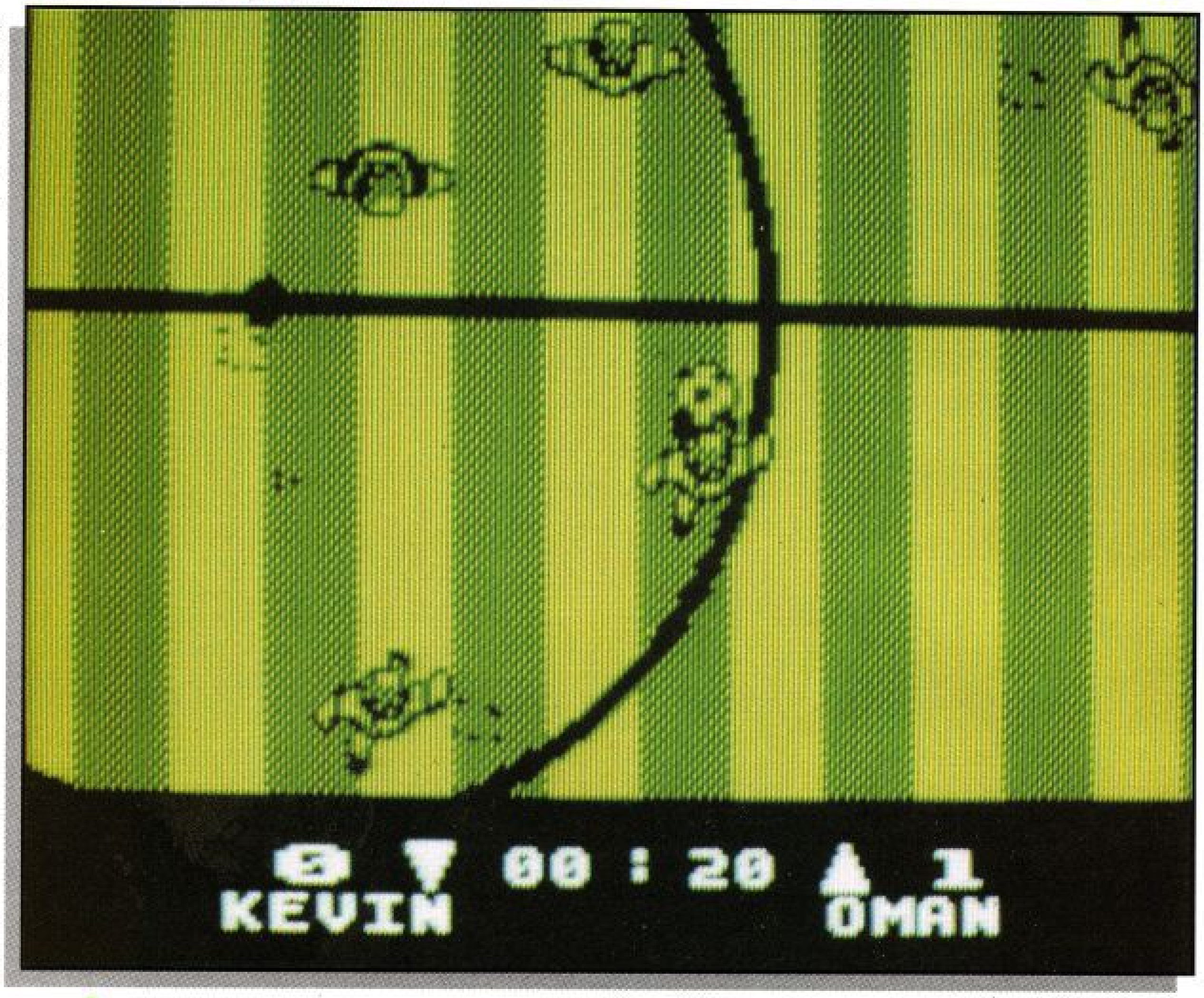
ROUND-UP

NAME	The Games Summer Edition		
SUPPLIER	U.S. Gold	PRICE	£9.99/£14.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

"Archery is always fun, more so when there are a few people around to rob."

As he runs the ball up the pitch towards the opposing goal, defenders tackle and slide in his path to try to stop the rampaging threat. Faster and faster, moving to one side, and then the kick -- straight to the net. The crowd roar and cheer, the players jump on the scorer, hug and kiss him. The excitement dies and the ball is kicked into play again.

Football has become a dangerous sport in the last few years. With crowd violence, fires in the stands, collapsing walls and the Hillsborough disaster, avid supporters might prefer to stay at home and watch on television. If you like playing the game, take a few friends to the common and have a kickabout or, alternatively buy *Microprose Soccer.*



This game, from the company which made its name producing

Microprose Soccer

simulations of aircraft and submarines, is abysmal. While the Commodore 64 version is the best of them all I would rate the CPC version one of the worst.

The game is played on a small area of the screen which scrolls rather pathetically. To add to the confusion the pitch has a mown look to it and, unless you are running at an angle or there are some pitch markings, you have no idea of which way you are running or how fast.

The players are not over-burdened with detail and the game is dominated by the colour green; in fact, the only colour which is not green is black, which is used to outline the green players and the pitch markings.

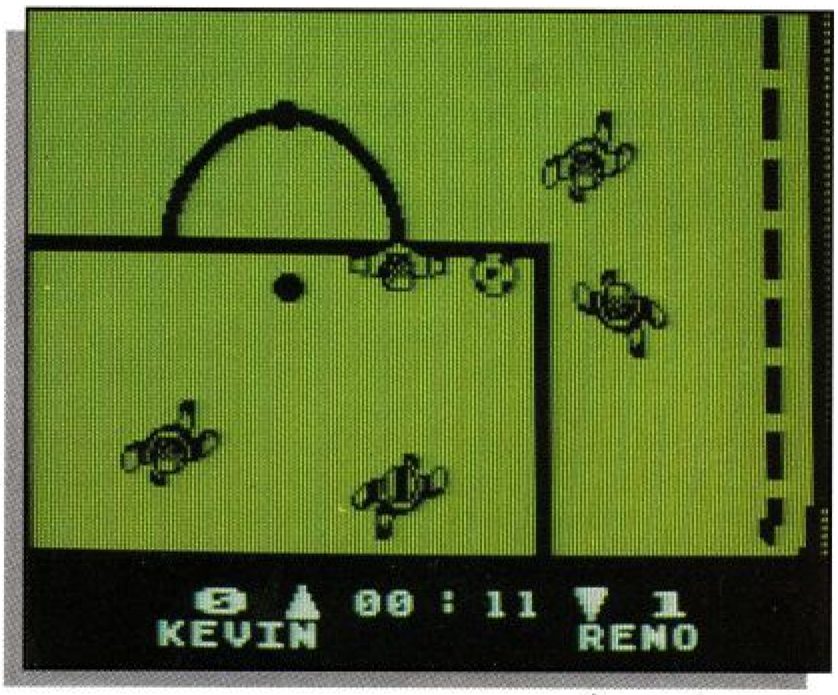
The ball moves as if it is half-filled with stones and rolls about the screen as if it were drunk. Kicking the ball in a straight line is incredibly difficult and it is likely to curve off at a 90-degree angle and miss the target. Players run round the pitch at a speed which might make you think they were wading through cold custard.

Microprose Soccer has various options to allow players to customise the game to suit their needs. There are two games which can be played. Football can be played indoors or outdoors. Playing an indoor game results in there being no throw-ins or corners and the ball bounces off invisible, presumably black, walls. Two players can battle in a two-player friendly, or single players can attempt to beat the computer.

One pleasant feature is the ability to replay every goal scored, which results in a flashy 'rewind' sequence, the kind of thing you get when you review a video. The game then plays again with an 'R' in the top corner indicating an action replay.

Outside games are subject to weather conditions and you will often find the pitch soaking wet and the rain pelting down. Microprose Soccer is not my idea of a good game and is not much fun to play.

Andrew Banner



ROUND-UP

NAME	Microprose Soccer		
SUPPLIER	Microprose	**PRICE**	£14.99/£19.99
GRAFFIX			
SONIX			
PLAYABILITY			
OVERALL			

"If you like playing the game, take a few friends to the common and have a kickabout or, alternatively, buy Microprose Soccer."

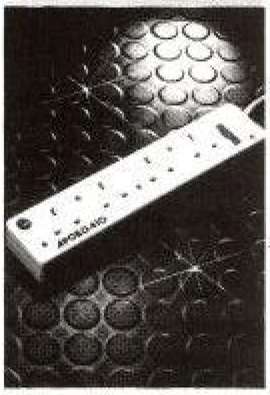
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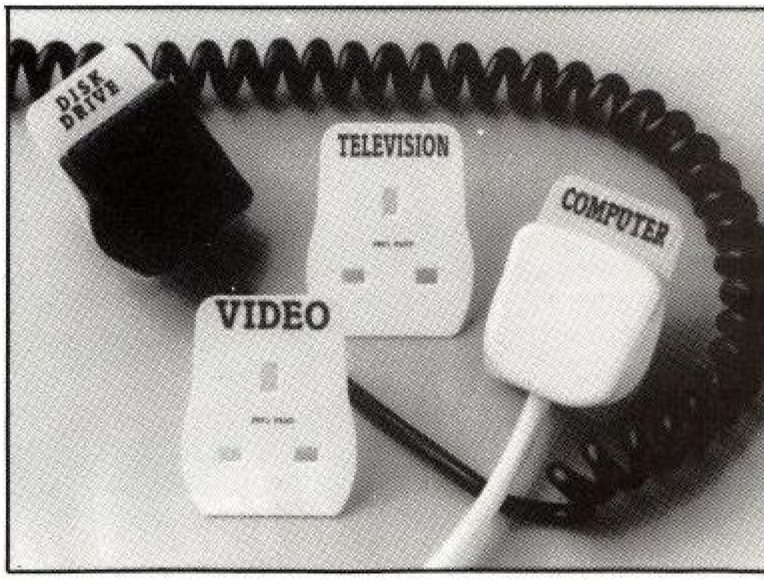
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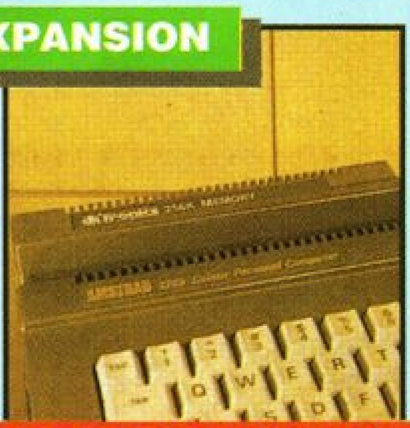
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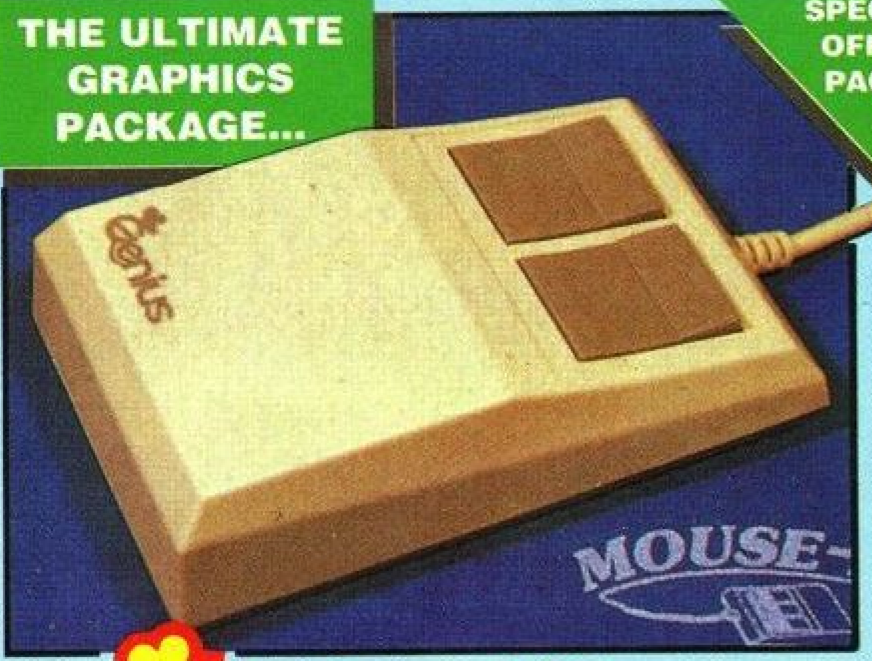
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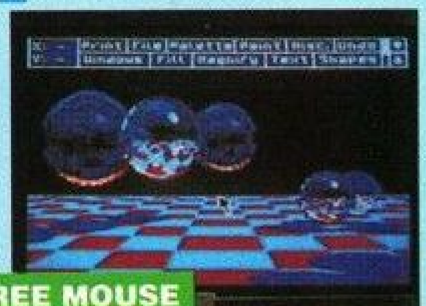
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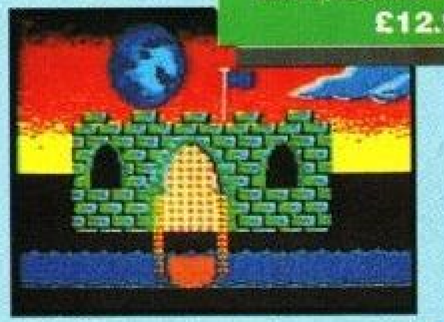


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The mean machines are but a disc away

Lee Paddon the man at the controls sets forth to bring you all the action your Amstrad can handle.



Are you fed up up wasting stupid aliens ploughing endlessly into your deadly laser cannon? Do you not care? where the lost treasure of Miniscule Imagination might be? Why not load a flight simulator and use the old grey matter as well as the joystick fire button?

After a slow start, most companies have converted their flight simulations to the Amstrad so that now the choice is wide. One of the most popular programs of the last year or so is the Microprose *Gunship*. It has notched vast sales on both sides of the Atlantic on virtually every format but the Amstrad version was, rightly, not a big hit. It is by far the worst conversion of the game and has done harm to the high esteem in which Microprose is held. The company has a reputation second to none for high-quality games which takes a battering when something so shoddy is published.

The objective is to rise through the ranks to Colonel by accumulating points scored depending on how difficult you make life for yourself. The more realistic the simulation and the tougher the opposition, the more points are awarded. Depending on the degree of gung ho selected, the successful pilot will receive anything from a pat on the back to a Congressional Medal of Honor. Unsuccessful pilots will, of course, be buried with full military honours and next of kin will be informed.

The Amstrad version, however, suffered from painfully slow, ill-defined graphics and very poor cockpit detail. This all rather detracted from the gameplay which was still there under all the poor graphics. The feeling of sweeping low over enemy tank formations blasting away with machine guns and rockets was totally absent.



The Gunship goes where all fear to tread.

Microprose has two other offerings which illustrate the two extremes of flight simulation. *F-15 Strike Eagle* is possibly the best-selling flight simulation of all time, spending a year or two at the top of the U.S. software charts. By today's standards it is simplistic but at the time it defined new standards of realism and detail. It had a detailed head-up display, plenty of systems to play with and more than a nod in the direction of accurate flight performance and reproducing the abilities of the real aircraft.

There are a number of missions to try, performed in various areas of the world – even one which was adapted after the event to "simulate" the U.S. bombing raid on Libya. Ground detail is limited to graphics of the various targets and the ground is flat. That allowed you to try the favourite trick of roaring along at Mach 1.5 roughly five feet off the dirt. You never had to land – you just flew to the vicinity of the base and magically teleported home.

Acrojet, at the other extreme, does not give you a single commie to waste, not a single splodgy graphic to bomb or strafe. What it will do is test your piloting skill to the limit. The idea is to perform a series of aerobatic manoeuvres and then land the aircraft in the quickest possible time.

Getting the best time requires absolute precision in each movement; you really have to know your stuff. Most people find landing the worst part about flight simulators but in Acrojet the idea of barreling into the final approach with the throttle wide open, then chopping the throttle, throwing out the airbrakes and praying, certainly takes some beating. The aircraft systems are minimal but in a stunt jet that is what you get. A neat idea is allowing several players to compete in succession and comparing times. In a multi-stunt event the onus is on the player with the worst time to try to make up time, pushing the "envelope" with inevitably disastrous results.

Cuban Eights, Under Ribbon loops and simple circuit races are included in a highly-courageous effort by Microprose to get out of the rut of combat flight simulators.

Mirrorsoft is another company committed firmly to the simulator genre. As befits a Maxwell offspring it has two programs depicting British aircraft on offer. *Strike Force Harrier* features that remarkably odd and singularly eccentrically British invention, the Harrier GR1 jump jet. Weak points of the aircraft include its relatively limited range and warload but its strength is in its ability to operate completely independetly of airfields. That is due to the reasonable assumption that airfields would be a top priority as soon as any conflict begins.

That statement really opens a rather large can of worms in the military establishment. There is one school of thought which maintains that airfields are tough nuts to crack. Experience has shown that runways can be repaired very quickly after bomb damage. Aircraft can be dispersed to hardened aircraft shelters and ammunition dumps placed deep under ground.

Harrier enthusiasts point out that, as airfields are fixed, compact, easily-recognisable targets, they would be an obvious target or pre-emptive tactical nuclear strikes. Such an argument is ultimately unresolvable but for the RAF it is still handy to have an aircraft which can

deliver whoever is proved correct. Cynics would point out that the airfield proponents do not want to lose their comfortable offices and handy clubs. Rough strip operations usually mean hurtling around in Land Rovers and sleeping in cold, draughty tents – but I digress.

The graphics are somewhat doubtful in this game, with enemy aircraft and tanks appearing as a



series of sprites rather than in true 3D vector graphics. Despite that, the feel of the aircraft is very true. Particularly impressive is the handling of both vertical and short take-off and landing.

When the pilot selects vectored thrust the effect on the handling of the aircraft is fairly dramatic. Lift increases and the nose starts to pitch down. The pilot has to be wary of those effects, especially as the rather limited graphics give very few visual clues about what is happening, so your eyes must stay glued to the instruments.

The scenario for Harrier is particularly silly. The idea is that you fly to an area, destroy the interceptors which come to meet you and then clear the area below of enemy tanks. After that, you land and the friendly ground crew turns up deep in enemy territory, presumably having hacked a way through the enemy lines with nothing more lethal than an *A to Z* and a compass. If this process is repeated several times the player can blow up the enemy headquarters and win the game. I have never heard of anyone who has had the patience to complete this loopy scenario.

Spitfire '40 is that equally rare phenomenon, the historical simulation. As the title suggests, you are one of 'The Few' taking on the Luftwaffe hordes. Once again the simulation is reasonably accurate but the setting rather lets it down. Before getting strapped in you get a briefing telling you that there are so many "bandits" at "angels" so and so, bearing whatever. So off you go to make the intercept. Once you get there, after a little stooging around and consulting your patent 1940s "radar" set, you find the bandits which present themselves to you one at a time.

After giving them what for with the trusty Brownings it is back to base in time for tiffin but beware of the Stukas. Historically they were as easy to hit as a barn door but Spitfire '40 has imbued the rear gunner with incredible markmanship. It is a pity that with the handling and cockpit detail done so beautifully the program was let down by failing to simulate the really interesting bit – the dogfighting.

Electronic Arts has the occasional foray into this field. One of its efforts is *Chuck Yeager's Advanced Flight Trainer*. It is another "where did all the bad guys go" type program with the emphasis firmly on teaching you how to fly a bewildering array of real-life and fictional aircraft. The idea is that, just like good ol' Chuck "right stuff" Yeager, you will take your life in your hands, climb into the cockpit of an unknown aircraft and push round the edge of the "envelope" – the flight envelope is a representation of how an aircraft performs.

All kinds of things like height, speed, weight and throttle affect this. When your life depends on it, it may seem a little foolhardy to climb into an aircraft about which you know nothing – but Yeager did. I will leave you to work out his mental state.

The program has a slightly novel twist to the flight controls problem. The difficulty is that an aircraft control yoke is an analogue device wheras the standard joystick is digital. As most computers have no recognised standard for an analogue joystick, you are stuck with it.

Chuck Yeager represents the control yoke with a box symbol slowly back and so on. Two problems are that it is difficult to change direction quickly and it is difficult to fly straight and level unless you tell them to do something different. The program is well worth examination if you are interested in learning about "proper" flying.

Digital Integration has virtually dedicated itself to flight simulators from its formation in the heady days of 1982. *Tomahawk* simulates the AH-64A attack helicopter, the same machine as the Microprose Gunship. It has a different emphasis. The systems and gameplay are rather limited but the helicopter handling is superb. Even before the U.S. military released the fact that the machine could do loops and rolls, Tomahawk owners were throwing the machine around.

That, as any scientist will tell you, is the test of a good model. If it predicts something you did not know and you then go out and prove the prediction, you begin to feel much more confident about the model.

The company's *Advanced Tactical Fighter* game is somewhat more light-hearted. It is more reminiscent of the Cascade *Air Combat Emulator* series and the Durrel *Combat Lynx* games. It is big on action, light on realism. There is also a strategic flavour to it. Knocking out various installations will help the overall tactical situation. Follow a consistent strategy for a number of missions and the enemy will surrender. This is now a very prevalent idea in flight simulators where programmers are beginning to realise that the simulation is fairly old hat and the player has to be given more playability in terms of an overall objective. Combat Lynx was the first to blaze that trail and, despite



its age, it is well worth sampling, if you can pick it up on a budget label or a compilation.

The future looks rosy for simulator fans, with the first of the new wave of combat simulators on the way. The Digital Integration *F-16 Combat Pilot* breaks new ground, combining accurate flight modelling and aircraft systems with depth of gameplay. The Microprose *Stealth Fighter* promises to give the player some exceptional challenges as you attempt to remain hidden from the enemy radar detectors, complete your mission and vanish again before enemy fighters and missiles can deal with your hapless, lumbering craft.

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PROPRIETOR M.J. COOPER

On the road with the Hack



Life gets a little cramped for the Hacker, so its out on the road and over the hill to a new haven full of pokes.

Welcome to a very mobile hackers' column. Mobile? Yes, the hackery is moving to larger premises, not in anticipation of your increased mail but because baby Kate is now taking more room underfoot than a hungry cat and I would like somewhere to put the computers without them getting filled with rusk. Just to prove that somebody can find something around here, John "Hackman" Girvin has found a few pokettes.

The first swipe at the world is directed at the nether regions, the Hewson *Netherworld* to be precise. It gives you between one and 255 lives – infinite, if you really want, infinite wall-basher-inners, infinite demon killers and infinite time.

With the infinite time pokette, the last digit on the clock still goes down and the wall basher/demon killer pokes will work only if you bother to pick up something first. All other pokes are satisfactory so I guess you will want to get on with it. Here it is!

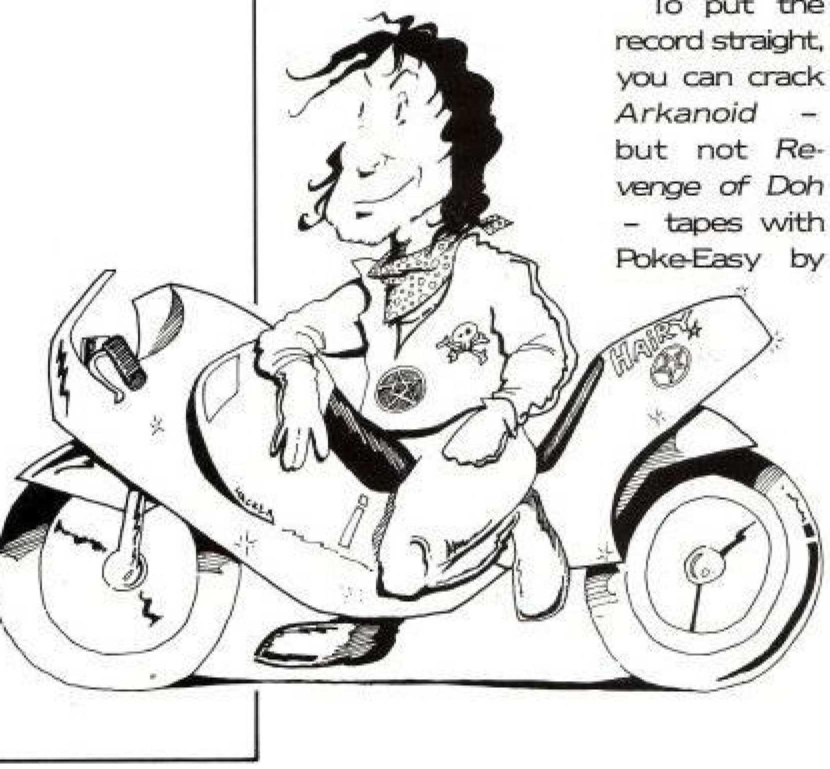
Cut closely on to the end of that one is another for *Pacmania* by Grandslam. John's poke-thingy gives you invulnerability to ghosts. Not that you need it; playing this game is

```
1 'NETHERWORLD hacks
2 'By John "HAKMAN" Girvin
3 '(C) March 1989 HLF
4 '
10 MODE 0:OPENOUT"D":MEMORY &3FBF
20 CLOSEOUT:LOAD"!netherw.bin",&3FC0:
30 POKE &415B,64:POKE &415C,0
40 MODE 1:CALL &BC02
50 INPUT"Start with how many lives (0-255)";lives
60 RESTORE:addr=&40
70 READ byte$
80 IF byte$="WURLDE" THEN GOTO 130
90 IF byte$="**" THEN byte$=HEX$(lives,2)
100 POKE addr,VAL("&"+byte$)
110 addr=addr+1
120 GOTO 70
130 CALL &3FC0
140 '
150 '*** LEAVE 170 IN ***
160 '
170 DATA af
180 'Infinite lives
190 DATA 32,bf,27
200 'Infinite wall bashers
210 DATA 32,74,21
220 'Infinite demon bashers
230 DATA 32,28,23
240 'Infinite time
250 DATA 32,b2,64,3e,c3,32,b6,64
260 '
270 '*** LEAVE 290-320 IN ***
280 '
290 DATA 3e,**,32,0f,29,a4,48,4c
300 DATA 46,03,89,c3,00,01
310 DATA WURLDE
320 'I beat you to it Jemmy!
```

about as easy as lying in politics. The 'Ya-boo I got ya' sound effect caused by colliding with a ghostie is still there, though, so if one of the etheral swine keeps following you, it makes some strange noises. They are best solved by turning that little knurled knob on the side. Apart from that, the rest of the poke is all satisfactory.

You type this in. Do not forget to save it.

To put the record straight, you can crack *Arkanoid* – but not *Revenge of Doh* – tapes with Poke-Easy by




```
1 'PACMANIA hacks
2 'by John "HAKMAN" Girvin
3 '(C) March 1989 HLF
4 '
10 RESTORE:addr=&310
20 READ byte$
30 IF byte$="PACMANIA" THEN MODE 1:CALL &310
40 POKE addr,VAL("&"+byte$)
50 addr=addr+1
60 GOTO 20
70 DATA 21,00,01,11,00,02,3e,16
80 DATA cd,a1,bc,21,24,03,22,05
90 DATA 01,c3,00,01,21,07,17,36
100 DATA 00,23,36,00,23,36,00,a4
110 DATA 48,4c,46,03,89,c3,84,03
120 DATA PACMANIA
```

Galeper Software and find infinite lives on it, too. Galeper sent a letter pointing this out and mentioning a few other games it can back up, *Head Over Heels* and *Grand Prix Simulator* to name two, plus assorted Firebird, Zolyx 199, and Code Masters games.

It also mentions that the position where the disc copier keeps asking you to change discs can be circumvented on a two-drive machine by resting something weighty on the delete key. A little messy, but it works.

On Head Over Heels, it supplied a sample program to get a Multiface poke into it, which looks very much like this:

```
10 a% = &26BF (infinite lives part 1)
20 p% = &18
30 pk$ = hex$(a% + 6029,4)
40 POKE &202, VAL ("&" + RIGHT$ (pk$ + 2))
50 POKE &203, VAL ("&" + LEFT$ /pk$ + 2))
60 POKE &204,p%
70 RUN "BOOT"
```

Armed with a new respect for Poke-easy plus, I looked again at the problem of gettng more than one game on a disc. My earlier suggestion of perhaps copying things into separate user areas will not work, as the BOOT program re-starts the disc ROM and that sets the user area to zero. With any game, say Arkanoid, re-name the GAME file to something like ARKAN.COD and write a program along these lines:

```
10 MODE 0
20 PRINT "Running Arkanoid"
30 LOAD "boot",&AF00
40 a$ = "ARKAN.COD"
50 POKE &AF1F, PEEK(@a$)
60 POKE &AF21, PEEK(@a$ + 1)
70 POKE &AF22, PEEK(@a$ + 2)
80 CALL &AF00
```

That progette takes the name in a$ and puts it into the BOOT program. The modified BOOT program then runs, reading in the named file. As the BOOT progam is modified in-flight there need be only one copy of it on a disc. All in all, apart from not doing speedlock II – are you listening Galeper Soft? – I am now much more fond of Poke-easy than I was and may even use it from time to time.

Now to a hint for *BarbarianII*. John O'Connor says that when you have killed the first monster – some form of gorilla apparently – go into the cave. Do not jump over the hole; turn about – ignoring cries of 'Coward!' – and leave the cave. Go left into the next screen and walk and you have an extra life! Wander your immortal way back to the cave and repeat until you are sick of it. So long as you do not jump the hole, you will continue to keep getting extra lives.

Two letters now from Christopher Wootton in Tasmania, who has been thrashing it out with the Ozisoft double game pack disc probably not available under that name in the U.K., and the Elite six-pack disc, which is.

```
1 'Battle of Britain Disc Poke
2 'by Chris Wootton (May 1989)
3 '
10 OPENOUT"d":MEMORY 755:CLOSEOUT
20 FOR a=0 TO 15:READ b:INK a,b:NEXT
30 MODE 0:LOAD"bobs",&C000
40 LOAD"bob2":LOAD"bob3",&967B
50 POKE &4030,0:POKE &3271,0
60 POKE &3272,0:POKE &3273,0
70 CALL &2803
80 DATA 0,26,2,6,9,10,11,12,13
90 DATA 14,19,20,22,23,24,25
```

He has hacked *Battle of Britain* to give you infinite fuel – unleaded, too, but you will not notice the difference – and infinite ammunition; that is where all the extra lead went. Put this poke in your computer:

To use; load poke, put in games disc, type run, and blast. Speaking of blasting, the pokeykins for a discified

```
1 'Dynamite Dan Disc Poke
2 'by Chris Wootton (May 89)
3 'Poke provides infinite lives
4 '
10 MEMORY &3FFF:LOAD"dan"
20 FOR a=&BF00 TO &BF13
30 READ a$:POKE a,VAL("&"+a$)
40 NEXT:CALL &BF00
50 '
60 DATA 21,09,bf,22,88,40
70 DATA c3,00,40,f5,3e,c9
80 DATA 32,c4,16,f1,cd,03
90 DATA b9,c9
```

Dynamite Dan is next. It works the same way and gives you infinite lives:

Wootton has also been monkeying around with *Killer Gorilla* and *Dragon's Lair*. These are both infinite

```
1 'Killer Gorilla Disc Poke
2 'by Chris Wootton (May 1989)
3 'Poke provides infinite lives
4 '
10 MEMORY &40FF:LOAD"kong2"
20 FOR a=&BF00 TO &BF07
30 READ a$:POKE a,VAL("&"+a$)
40 NEXT:CALL &BF00
50 '
60 DATA 3e,a7,32,18,51,c3,00,41
```

```
1 'Dragon's Lair Disc Poke
2 '(Works with Elite 6-pack version)
3 'by Chris Wootton (May 1989)
4 'Poke provides infinite lives
5 '
10 MODE 1:OPENOUT"a":MEMORY &2FF
20 LOAD"dl",&300
30 FOR a=&BF00 TO &BF07
40 READ a$:POKE a,VAL("&"+a$)
50 NEXT:CALL &BF00
60 '
70 DATA 3e,a7,32,a7,25,c3,17,25
```

life-type pokettes and work in the same way – or I hope they work; I do not have the Elite six-pack:

"Never laugh at a live dragon" – Bilbo Baggins.

Speaking of monkey business, has anyone noticed that the second page in *Vindicator* loads backwards? Unconventional with a capital 'W' is that.

There were to be two maps; one for *Total Elipse* by Michael Gleson and one of *Dizzy II* by Edward Melkuish but I have missed the deadline again so they will probably make it into next month's spot.

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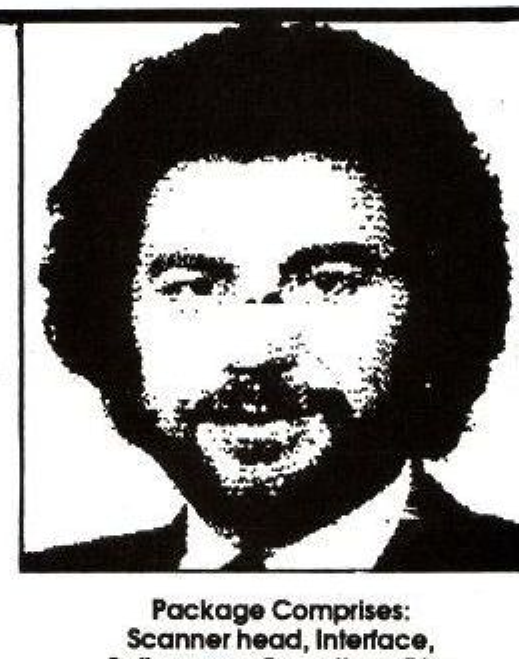
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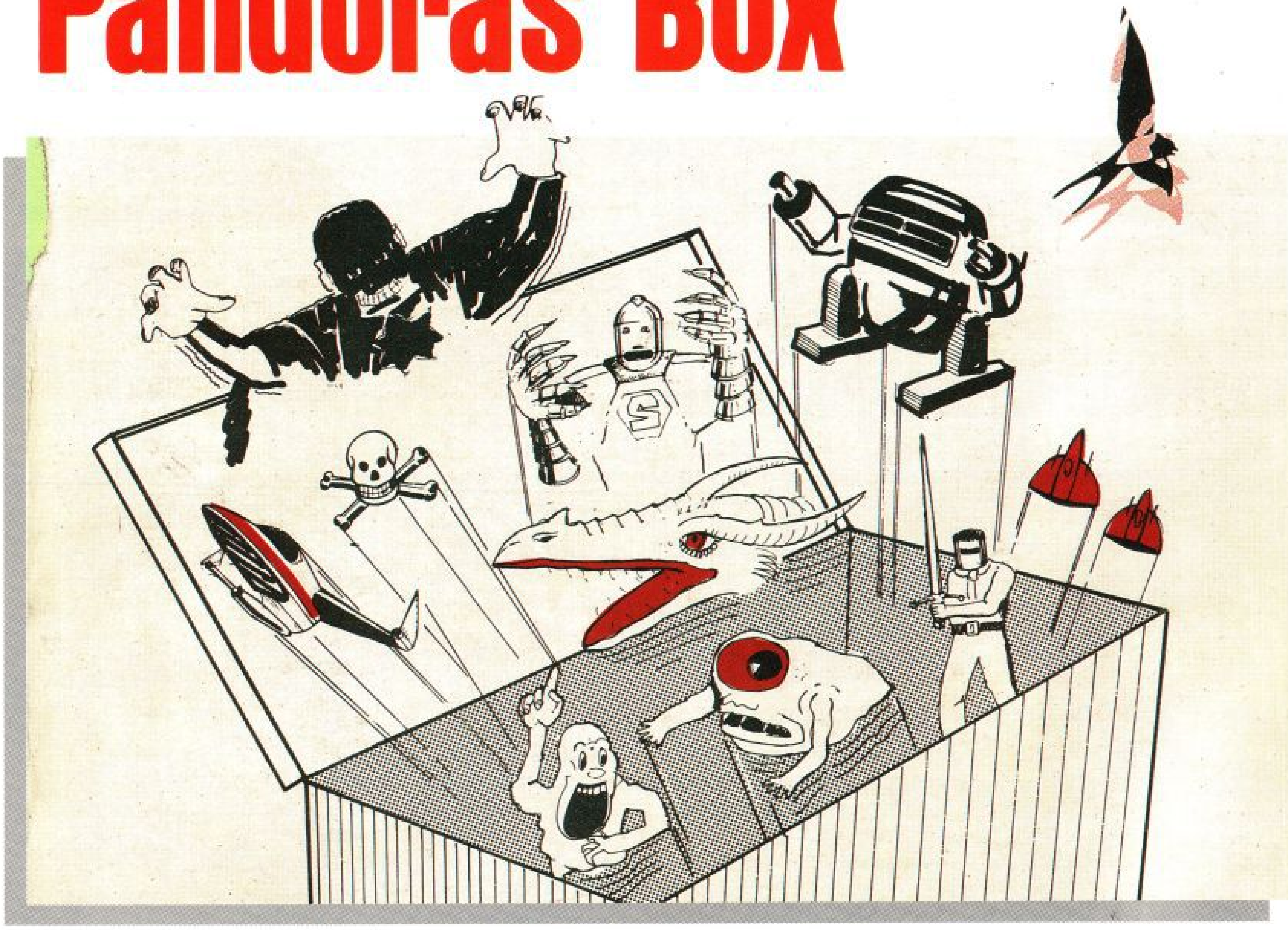
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Unleashing the secrets of Pandoras Box

Kenn Garoch technical ace gives Pandora the once over with an all-seeing cynical eye.



Program generators are not new and games program generators have been around for a long time on various machines. Pandora is a games program generator for the Amstrad CPC series of machines.

The main difficulty when writing the arcade-type of computer game is that you need to get the best from the machine. It must be pushed to its limits in terms of speed, colours, sound – in fact anything of which it is capable. The only real way to do this is to use machine code which, as anyone who has tried it will tell you, is a time-consuming business.

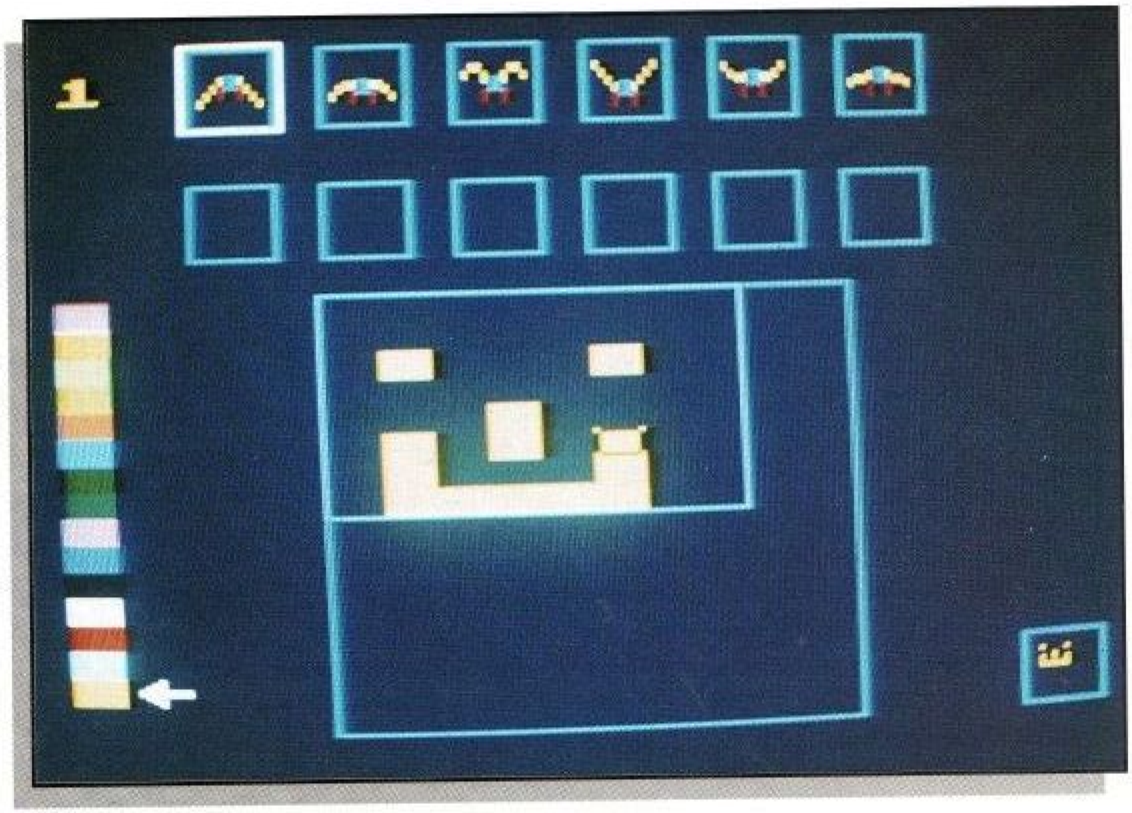
The reason for the existence of high-level languages such as Basic is that they take much of the hard work out of programming. At the machine code level, routines must be written for everything from reading the keyboard to printing things on the screen. Fortunately, once the routines have been written they can be used in other programs, saving a great deal of time and effort.

The idea of a games program generator is to take some of the hard work out of programming by using pre-written routines. With Pandora it means providing a selection of Basic-like commands to control graphics, text, sound, sprite and program control. By putting together these commands in fairly simple programs, fairly sophisticated games can be created, in theory anyway. In practice there are limitations and you do not always get the most from the machine.

The limitations occur in a number of ways, the most obvious being that line drawing graphics run at

about the same speed as in Basic. There is no advantage in using Pandora over Basic if much line drawing is required. Another limitation is that there is no string handling. It could be simulated by using the simple arrays but, again, the speed increase is not particularly striking.

Scratch any text adventure-type games. So what is left? There was a game which was very popular some time ago, called *Space Invaders*. It used a selection of animated sprites which moved across a blank screen and dropped bombs on a rocket base which you controlled at the bottom of the screen. It was not very complicated and did not require a great deal from the hardware. Pandora can be used to create that type of game and, so far as I can see, not much else.



Perhaps I am being a little unfair, since someone with plenty of imagination and a flair for games writing could, perhaps, wring something original from the package. On the other hand, only a limited number of games can be written using sprites on a plain background.

Pandora is presented on a disc and is accompanied by a 35-page A5 booklet. The two main pieces of software are the game compiler and a sprite editor. There are also three demonstrations, all of which are fairly uninspired, in the form of source, sprites and compiled/runnable game.

The language is very Basic-like. Almost all the commands will be recognisable to anyone who has written programs in Basic. The first problem which occurs when using the language is that you need access to some form of text processor. Programs do not use line numbers and cannot be edited from Basic. The suggested way to circumvent this is to put your programs into data statements in a Basic program and then write them to a file, which is tedious. I would not have thought it would be too difficult to provide some kind of simple editor. The only text editor really catered for is *Protext*. Programs written with it can be compiled directly from RAM. Otherwise the only way is to make the program into some kind of ASCII text file on disc.

The compiler is invoked by means of the ICMP RSX command. It will ask for an input file name – return uses an in memory Protext file; an output file name – return compiles to memory; and a sprite bank created previously with the sprite editor. On getting all of those the source program will be compiled to the destination file and any errors reported. The sprite bank file is incorporated into the destination file which can then be run as a stand-alone program, i.e., it is a .BIN file which can be executed with RUN and requires no other files.

Converting the source program – the Pandora commands – into a program via the ICMP command is fast. One very annoying feature was

> "Pandora is presented on a disc and is accompanied by a 35-page A5 booklet. The two main pieces of software are the game compiler and a sprite editor."

that only the first error message was displayed. Compilation stops when an error is detected. The problem was that errors could really be corrected only one at a time. It would have been much better to report all the errors, allowing them to be corrected in one edit session. I realise that this can sometimes be difficult as some errors can breed other errors, e.g., with nested IF commands which are not allowed but I think a little more work would have dealt with this problem.

The language has a few limitations when compared to Basic. Some of them do not really matter; others are a little irritating. Variable names are only single letters and are limited to numbers between –32768 and 32767, i.e., signed integer words. That is fair enough when compared to Z-80 assembly language which would allow only six word variables at most, using the alternate register set.

Complicated arithmetical assignments are not allowed. For example, LET A = 1 + 2 + 4 gives a compilation error and it transpires that there are only four operations available + – */, and they cannot be used more than once on a line. I suppose it is better than machine code where * and / have to be coded from scratch.

One of the more irritating points is the way some graphics commands use the standard co-ordinate system – the bottom left of the screen is 0,0 and the top right is 639,399 – and others, mainly to do with the sprites, use 'screen co-ordinates'. Here 0,0 is at the top left and the maximum screen position 74,182 is at the bottom right. Determining which is which is maddening.

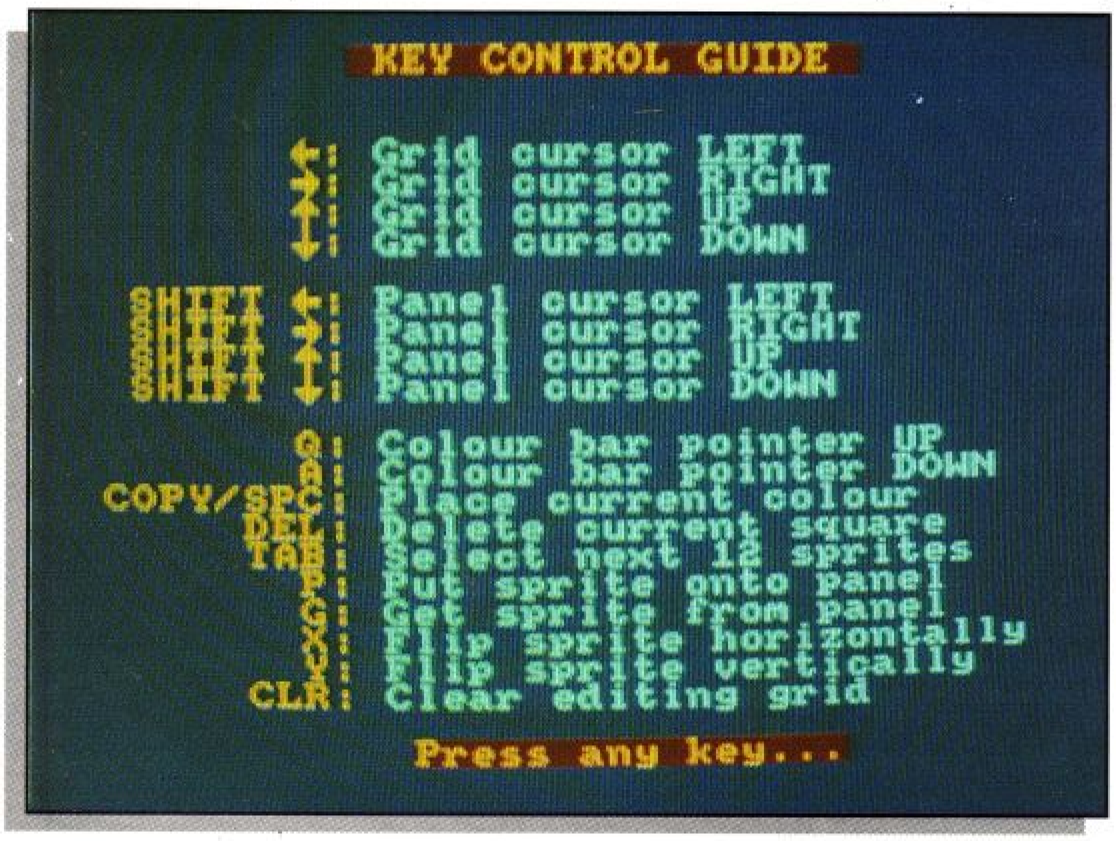
Pandora does not allow very good programming style to be developed.

There are virtually no structures, e.g., REPEAT UNTIL, WHILE WEND and so on, apart from IF ENDIF. This encourages bad style by making the program jump to labels with GOTOs from within. To write a routine to count to 10, the following must be used – there is no FOR NEXT:

```
a = 0
.label
a = a + 1
IF a<11:GOTO label:ENDIF
```

The reason for this being bad style is that it is almost unreadable; if you write a program in this form and then return to it six months later you will have great difficulty trying to understand how it works. The use of GOTO is bad in any case since it encourages tangled programming.

Is there anything good about Pandora? I think that the sprites are not bad and allowing 48 on-screen at a time is reasonable. Only 32 of them can move and then they flicker and erase the background; running all 32 at once slows them somewhat. On the other hand, the controls are excellent.



There are two ways of putting a sprite on to the screen. The first is with the PUT and WIPE commands which set and remove them. This is really good only for static images or sprites which do not move often. The other way uses the DRIVE command. Sprites can be given an initial X,Y position and an X,Y direction. When the are turned ON and the DRIVE command is issued they will move automatically.

Animation effects can be created easily with the ANIMATE command. Each screen sprite – numbered 0 to 31 – can be given an initial frame or design number – see the comments on the sprite designer – the number of designs or display, the first in the sequence, and the rate of animation. Issuing DRIVE will now step the sprite design as specified.

If a number of sprite designs were made up so that each gave the different position of a man walking, the animate command in conjunction with XDIR, to set the walking direction, could be used to make the spriteman appear to walk across the screen. There are a number of other commands available, all of which make a rather pleasant sprite control system.

Sprites are designed in mode 0 with the supplied EDITOR program. It is a simple sprite editor which sets up a grid on which to design the sprite. The required colour can be selected from the palette at the side of the screen and placed in position on the grid by means of the cursor keys and the spacebar. Different designs can be put into one of a bank of 12 at the top of the screen.

Previously-edited designs can then be fetched from the bank for modification, making animation easy. There are four 12-sprite banks giving a maximum of 48 sprites available to a program. Each sprite can be either 8x8 or 10x16 and Pandora commands BIG and SMALL can be used to set this.

Once editing has finished, all 48 sprites are saved to disc under a user-defined filename. The ICMP command can then be used to incorporate them into the program. If you need to try different sprite sets with a program there is an IBANK command which can be used to load a different set after the program has been compiled to memory.

The manual is worth mention, more because of what it lacks rather than for what it contains. I spent some time trying to get more than one sprite moving with the DRIVE command. It was not until I looked at the source code for one of the demonstrations that I found the MAX command. It is not mentioned in the manual and it is crucial for setting the maximum number of sprites working with DRIVE. There is no index and although it is a thin book, it is difficult to find adequate detail on a command.

> "The idea of Pandora is that it can be used instead of an assembler to create arcade-style games. It can do this and I should think that most people will be able to create Space Invader-type games easily."

The idea of Pandora is that it can be used instead of an assembler to create arcade-style games. It can do this and I should think that most people will be able to create Space Invader-type games easily. The disadvantage is that they will be rather slow and not up to commercial standards. For this you will need to resort to machine code. I suspect that it would be of more help to programmers to produce a booklet or disc with the assembler source code for the sprite routines. They could then be adapted to a particular use and incorporated into machine code programs.

Details:

Name – Pandora

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All other word processors, even the ROM versions, need to access the programme disc to test the spelling. (ROM versions have the dictionary on disc). This is slow and can involve many disc changes. For example, Protext needed the disc to be changed eight times to check the spelling of our test file, whereas BrunWord needed no disc in the drive.

The 40 page BrunWord manual has several detailed examples, starting with step by step instructions to produce and print a simple letter. But your very first step is to load the TUTOR file into BrunWord. This takes even the complete novice straight into word processing and demonstrates the powerful editing and formatting features of BrunWord. There are also examples of printer control, showing how to create headings, to underline or to emphasis, and five deliberate spelling errors for you to correct. The tutor takes about 20 minutes to run through and after that you will feel confident to type in your own text.

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*40, 80 or 128 column display *Touch typing speed over 200 words/min *True insert or overwrite *Justify or unjustify paragraph or whole text *Justified text has balanced appearance *Instant word wrap *Block save, move, copy, insert and delete *Local editing with word delete/undelete *Adjustable margins and TABs *Column/Line/Page display with file name *True word count *Find and replace *Help menus *Memory filing system *Single character embedded printer commands (18 with 3 printer codes and 21 with 10 printer codes) *Page throw markers *Multiple copies *Odd/even page headers/footers with page numbers *Multi file printing (new page or continuous) *Print specified pages *Works with any printer *True display superscript and subscript numbers *User defined print characters *Load ASCII files from other word processors *Save ASCII files for other word processors *Files can be encrypted *Maximum file size about 9 pages of text.

BrunSpell Features

*Memory resident with word processor *Checks 4,000 words/min *30,000 word dictionary *No American spellings *Add up to 5,000 of your own words *Instant lookup *Helps to find correct spelling *Automatic correction.

DataFile Features

*Alphabetical, numerical, date sorting on any field *User defined headings *Search routine *Data merging into BrunWord *Label printing.

BrunWord Junior £18.00

Low cost version of BrunWord 6128 on 3 inch disc, including the spelling checker, 30,000 word dictionary, TUTOR file and manual. Holds just one page of text and cannot save words to the dictionary. Otherwise as BrunWord 6128. Up grade later to the full BrunWord for just £14.00

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BrunWord Elite £90.00

After 12 months of heartache and frustration, the PC show, of all places, gave the inspiration to complete this masterpiece. BrunWord Elite is for the perfectionist and is at its best with a quality printer. It is designed for the CPC6128.

We have written a booklet all about it but to give you just a flavour....... The text of this advertisement was printed directly in three columns using BrunWord Elite, a CPC6128, an 8 bit printer port and a Citizen HQP45 24 pin printer. Observe the superb proportional fonts downloaded directly from BrunWord Elite. Observe the equal spacing between words and the balanced filling of each line of text according to the true length of the proportional characters. Observe the correct use of the smaller font with more characters per line and narrower line spacing.

BrunWord Elite gives you almost desk top publishing capability, with the speed, the quality and the convenience of word processing. The whole programme is memory resident INCLUDING THE SPELLING CHECKER AND THE DICTIONARY.

The text of this advertisement was typed into BrunWord Elite, spell checked and then printed on one A3 sheet. The only essential access to the disc was during printing, to download the three proportional fonts. The total printing time was just 7 min 30 sec, printing each line twice and using uni-direction printing to achieve the sharpest characters. We had photocopied our standard advertisement outline onto the sheet. The lines were drawn with pen and ink, and the A3 page photographically reduced to A4 size.

In principle, BrunWord Elite could have printed this entire advertisement in one operation, as it can download a bit image file directly from the disc to the printer, while in the middle of printing. However, digitised graphics might be good enough to compliment a 9 pin printer but the HQP45 deserves better.

For the complete story of BrunWord Elite, send for a free copy of "BrunWord and Printer". This booklet includes a description of all our programmes and a critical comparison of several 24 pin printers. Make sure you read this booklet before buying a printer.

Comparisons

We have tested BrunWord 6128, Protext (disc) and Tasword 6128 with the same file of 3366 words.

BrunWord scrolled 40% faster than Protext which in turn scrolled 19% faster than Tasword.

Protext was the fastest to justify but needed a separate operation to see the result. BrunWord produced the best appearance of all three and was 30 times faster than Tasword.

Our simulated typing test reached 218 words per minute. Both BrunWord and Protext had no trouble at this speed but Tasword was very slow inserting text into the start of a paragraph and could only handle 16 words per minute.

The spelling test checked all 3366 words. BrunSpell took 52 seconds and needed no disc changes. Prospell took 6 min 24 sec and needed 8 disc changes. Taspell took 18 min 46 sec and needed 3 disc changes.

Info-Script £50.00

The great power of any database is only realised when the data can be put to use. A database system is centred around saving, sorting, finding and displaying the data. Obviously, very essential features but only if there is a purpose to storing the data. That purpose might be names and addresses for mail merging, a stock list of items being sold that generates a buying list, a catalogue of your compact disc recordings so that you can take a printout with you to the shop, a catalogue of recipes so that you can have a print out in the kitchen of the in-season treats, a catalogue of garden activities that gives you a reminder list to hang in the garden shed.......

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We gave considerable thought to this and concluded that the only solution was a proper text handling system within the database itself. In other words, a word processor. We looked into designing a special word processor but quickly realised that BrunWord, with its memory filing system, is ideal.

This is the exciting concept of Info-Script. A comprehensive relational database integrated with a powerful word processor, giving total flexibility to the way that the data is printed. A fast, user friendly combination that has the depth of power to keep up with your needs. A mail shot, a restaurant wine list, a summary of expenses.......

BrunWord Upgrade

Send your BrunWord 6128 disc, BrunWord manual (not the packing) and a cheque for £22.00. We will record Info-Script, test the disc and return with a new manual.

Letters

I am writing to say how much I enjoy using the BrunWord disc. It is easy to use and as I am not a good speller the dictionary is most essential. I dislike writing letters but the disc makes it easy and much more exciting.
Clare (age 12 - Herefordshire)

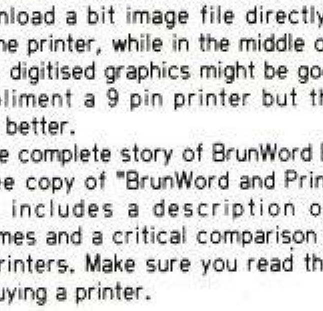
I wish to upgrade (BrunWord) to Info-Script. May I congratulate you once again on a superb product, without which I would be lost.
Mr L (Nottingham)

I have been using BrunWord for quite a while and like it very much. I have told my friends how good and user friendly it is. Also the speed and ease of commands. I enclose cheque for updating to Info-Script.
Mr G (Scotland)

Info-Script has got to be the best buy for Amstrad 6128 word processing. Keep up the good work.
Mr McQ (Leicester)

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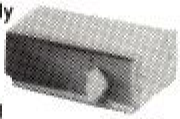
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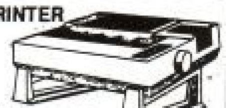
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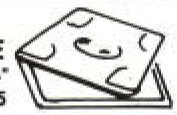
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Auntie John



AJ sighed and looked around him. As far as he could see into distance people were sitting at small desks, hunched over pieces of paper. There was almost complete silence, broken only by an occasional cough and the distant clicking of a pair of high heels. He sighed again, turning his attention to the examination paper in front of him.

"Describe how the production of sulphur dioxide is effected by altering the physical conditions of temperature, pressure and concentration. Indicate briefly how sulphure dioxide is used in industry."

It was no good. The more he tried to remember A level chemistry the more it seemed to slip away from him, into a subtle blend of obscurity and last night's television. He tried drawing a few exploratory pot plants in the corner of the page to see if his pen was working. It was.

So he drew a few more – and a few more.

The high-heeled clicking came closer, then stopped. He heard a sharp intake of breath and turned round to see the examination invigilator looking at his paper, which was by that stage almost totally covered by drawings of pot plants. Her face was a mask of indignant horror. She pointed at the paper and said:

. . ."John? Your ReadyBrek is getting cold! Get up!"

"Wahhh?" he mumbled. Then understanding flooded back, followed closely by relief. It was only a dream and he had not really been re-sitting A level chemistry. Thinking back, much to his surprise he had managed to pass chemistry A level and any pot plants which he had drawn were hidden inconspicously among drawings of laboratory apparatus. A levels were far behind him; the most pressing thing on his mind at the moment was writing a machine code high-score table for his latest game.

The design for the high-score table is fairly simple, consisting of 10 records. Each record consists of a 20-character string and a two-byte score. As usual, the problem can be split into several parts – a module to print-out the score table, a module to input a new entry and, finally, a module to place the new entry in the correct place in the table.

A program which sets up the data table and prints it out is shown in listing one. A Basic loader is not supplied because this is really only the kind of program you tack on to the end of one of your machine code games. It is not meant to be used on its own.

First module

Two main subroutines are used in this module, one to print-out the score in decimal form and one to print-out the string of characters which make up the name. Firmware calls are used to set the screen mode, set the cursor position and print a character to the screen. The cursor position call is similar to a LOCATE in normal Basic. If you cast your mind back you will remember we have met the subroutine to print a decimal number previously.

A window is defined in the middle of the screen to make centring the table easier. If you are using this routine, you must remember to take this into account when your own program is writing to the screen.

The data for the high-score table is also defined in this module. The last name in the table and the last score are labelled individually to aid referencing them in other routines. Some other space is reserved for the new entry to be stored in, along with its score. Each name must take 20 characters, even if the characters are spaces. In the listing the spaces are represented by hashes ( ).

```
ld hl, (yourgamescore)
ld (SCORE), hl
call CHECK__ENTRY
```

CHECK__ENTRY will decide if the name will appear on the table and call the code necessary to enter the player's name if that is so. The table should be displayed after this with a call to DISPLAY__TABLE, that is all there is to it.

Definitions used in following listings:

```
SET__MODE equ &bc0e
TXT__OUTPUT equ &bb5a
WAIT__KEY equ &bb18
WIN__ENABLE equ &bb66

;Module One

;Displaying the high score table.

DISPLAY_TABLE
;This routine may be called directly
by the user.
        ld a,1                  ;Clear the screen and
        call SET_MODE           ;put the High score
        ld h,6:ld d,34          ;table in the middle
        ld l,5:ld e,20          ;using a WINDOW.
        call WIN_ENABLE

        ld hl,TABLE
        ld b,10

NEXT_ENTRY
        push bc
        call PRINT_A_STRING     ;Write out the name.
        push hl
        ld a,(hl):ld e,a
        inc hl
        ld a,(hl):ld d,a
        ex de,hl
        call PRINT_A_SPACE
        call PRINT_A_NUMBER     ;Write out the score.
        call NEW_LINE
        pop hl
        inc hl:inc hl
        pop bc
        djnz NEXT_ENTRY
        ret

NEW_LINE
;Take a new line.
        ld a,10
        call TXT_OUTPUT
        ld a,13
        call TXT_OUTPUT
        ret

PRINT_A_STRING
;This routine prints a string 20
;characters long. HL contains the
;address of the first character.
        ld b,20
LOOP    ld a,(hl)
        call TXT_OUTPUT
        inc hl
        djnz LOOP
        ret
PRINT_A_SPACE

;Print a space
        ld a,32
        call TXT_OUTPUT
        ret
PRINT_A_NUMBER
;This routine prints the contents of
HL
;in decimal format at the current
cursor
;position. We have looked at it in
great
;detail previously.
        ld de,10000
        call pr1
        ld de,1000
        call pr1
        ld de,100
        call pr1
        ld de,10
        call PR1
        ld de,1
PR1     ld a,255
PR2     inc a
        scf:ccf
        sbc hl,de
        jp nc,PR2
        add hl,de
        add 48
        jp TXT_OUTPUT
TABLE

;The data for the table is stored here.
;All the strings must be exactly
;20 characters in length. They are
```

;padded out with s just for your ;convenience.

```
        db "The First Name######"
        dw 25600
        db "The Second Name#####"
        dw 12800
        db "The Third Name######"
        dw 6400
        db "The Fourth Name#####"
        dw 3200
        db "The Fifth Name######"
        dw 1600
        db "The Sixth Name######"
        dw 800
        db "The Seventh Name####"
        dw 400
        db "The Eight Name######"
        dw 200
        db "The Ninth Name######"
        dw 100
LAST_NAME
        db "The Tenth Name######"
LOWEST_SCORE

        dw 50
INPUT_BUFFER
        ds 20           ;Reserve 20 bytes
SCORE
        dw 2600         ;* Your score here!*
```

;note that SCORE and INPUT__BUFFER must follow
;the score table in memory, as this way they
;continue the structure of the data.

Second module

The second code module – listing two – is called when the game is over and it checks if the player has obtained a score which merits a placing in the high-score table. Because the new entry is interted only when his score is greater than the last element in the table, it makes sense to compare this score with the lowest entry of the table.

The label LOWEST__SCORE points to the location containing a copy of this lowest score. When called, the first thing the routine does is to compare SCORE – the player's score – to LOWEST__SCORE. If SCORE is not greater than LOWEST the routine returns and nothing is done; otherwise the routine reads in a string from the user – checking that characters are in a suitable range – and stores it.

The way LOWEST__SCORE and SCORE are compared may need some explaining. In Z-80 machine language there is no command which will return the greater of two registers. There is a way to check whether the result of a subtraction is positive or negative, so all we must do is subtract SCORE from LOWEST__SCORE and check the result. This is done in the routine CHECK__ENTRY. If the carry flag is not set, the result is positive – or zero – and so SCORE is less than or equal to LOWEST__SCORE. If that is the case the score is not large enough to be on the table and no further action is taken.

The name of the player lucky enough to reach the score table is read in from the keyboard by the routine GET__A__NAME. This routine uses the firmware to return the ASCII value of any keys pressed. The value is tested to see if it is 13 (RETURN) or 127 (DELETE) or out of range. Then it is placed in a buffer called INPUT__BUFFER.

```
;Module Two

;Getting the new entry from the user.
```

CHECK__ENTRY
;This routine may be called directly by the user.
;Check to see if the score is worthy
;of being placed in the high-score
;table.

```
ld bc,(SCORE)

ld hl,(LOWEST_SCORE)

scf:ccf

sbc hl,bc

        ret nc  ;return if SCORE < LOWEST_SCORE

        call GET_NAME

        call INSERT_NAME

        ret
GET_NAME

;Get name of player

        call NEW_LINE

        call NEW_LINE

        ld hl,message

        call PRINT_A_STRING

        call GET_A_STRING

        ret

GET_A_STRING

;Get a string typed-in by the user
;from the keyboard, and store it in
;space reserved in INPUTBUFFER.

        ld hl,INPUT_BUFFER
        ld b,20
BLANK   ld a,32         ;This routine removes
        ld (hl),a       ;any previously entered
        inc hl          ;garbage.
        djnz BLANK

        ld hl,INPUT_BUFFER
        ld b,0


INLOOP  call WAIT_KEY           ;Get ASCII code of key pressed.
        cp 13
        ret z                   ;ENTER pressed.
        cp 127
        jr z,DELETE             ;DEL pressed.
        cp 128
        jr nc,INLOOP            ;Ignore, its out of range.
        cp 31
        jr c,INLOOP             ;Ignore, its out of range.



        call TXT_OUTPUT         ;Print it.
        ld (hl),a
        inc hl
        inc b
        ld a,b
        cp 20                   ;Make sure only up to
        jr nz,INLOOP            ;20 characters typed.
        ret

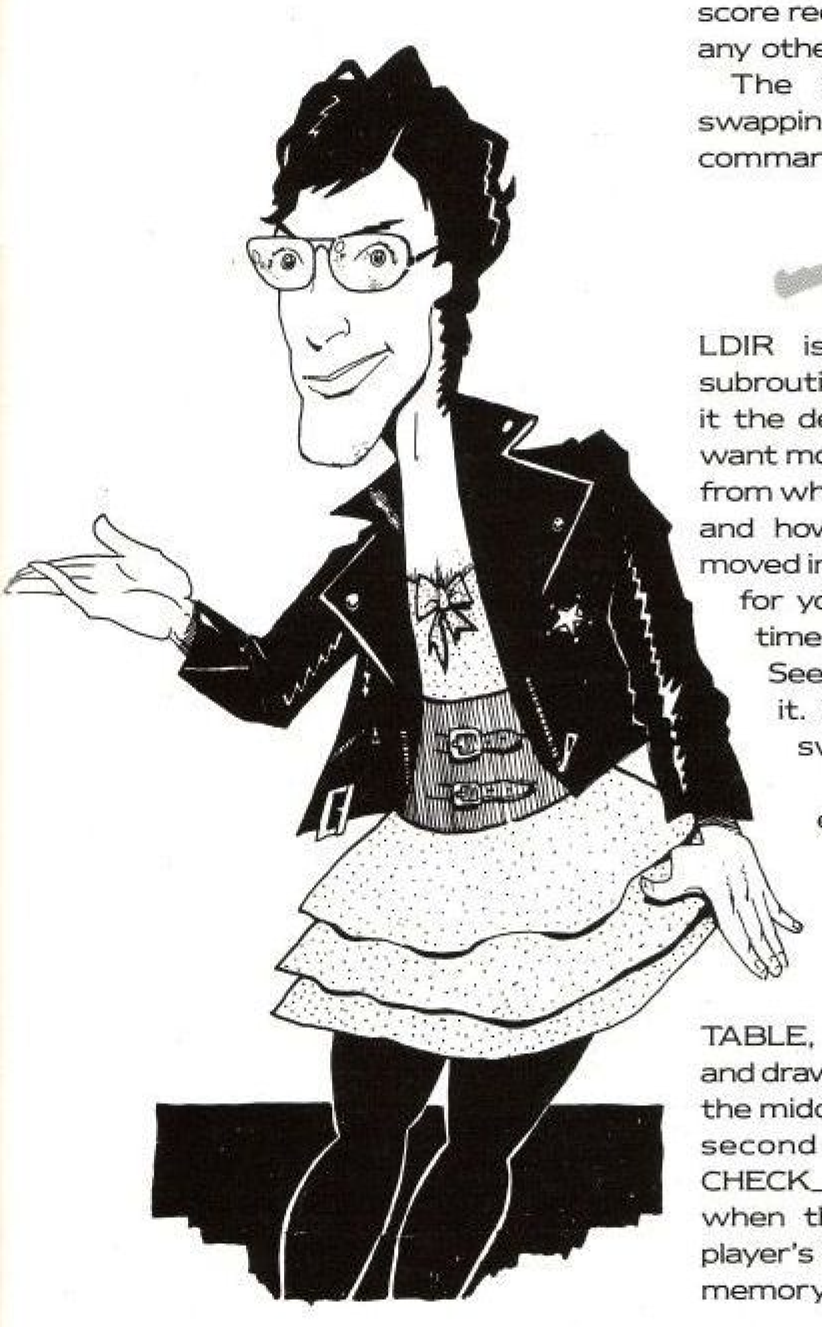

DELETE
        ld a,b
        cp 0
        jr z,INLOOP
        dec b
        dec hl
        ld a,32
        ld (hl),a
        ld a,8:call TXT_OUTPUT  ;Move back and erase
        ld a,32:call TXT_OUTPUT ;last typed character.
        ld a,8:call TXT_OUTPUT
        jr INLOOP


MESSAGE

        db "Please enter name:",13,10
```

Third module

The third and final module inserts the new entry into the correct place in the table. We could put the entry at the lowest point in the table and then sort the whole thing, or we could do something much cleverer, such as listing three, which takes the new entry and compares it to the lowest score in the table. If the new score is greater than the lowest score – which it must be to have reached this far in the program – both entries are swapped. Then it is compared to the next highest entry. Again, if the new entry is greater, the two are swapped. This continues until either the top of the table is reached or no swaps take place. At the end of all this the new entry will be in the correct place.



The routine INSERT will work its way up the table from the bottom, swapping any two entries where necessary. Do you see now why the INPUT_BUFFER and SCORE where placed immediately after the table? To the swap routine they are just another standard name and score record and can be sorted like any other.

The SWAP routine does all swapping, using the Z-80 LDIR command to do all the hard work.

LDIR is like a machine code subroutine in its own right; you give it the destination of the data you want moved in the DE register pair, from where the data is coming in HL and how many bytes are to be moved in BC and then it is all moved for you. SWAP uses LDIR three times to swap two entries. If this Seems silly to you, think about it. If you can do it with two swaps I would like to hear.

With all the assembler entered after the source of your own program, it remains only to detail the subroutines you may call. The first and most obvious is DISPLAY_TABLE, whichh clears the screen and draws the current score table in the middle of a mode 1 screen. The second routine to call is CHECK_ENTRY. It would be called when the game is over and the player's score has been loaded into memory pointed to by SCORE. e.g.:

```
; Module Three

;Put the new entry into the table.

INSERT_NAME

;This module inserts the name and relevant score
;into the correct place in the high-score table.

        ld hl,LAST_NAME
INSERT  push hl
        ld bc,20
        add hl,bc
        ld a,(hl):ld e,a
        inc hl
        ld a,(hl):ld d,a
;now DE contains the first score
        ld bc,21
        add hl,bc
        ld a,(hl):ld c,a
        inc hl
        ld a,(hl):ld b,a  :BC contains the
second score

        ex hl,de
        scf:ccf
        sbc hl,bc
        jr nc,EXIT        ;return it first >
second
        pop hl            ;Otherwise Recall hl,
        push hl           ;then store it again.
        call SWAP         ;Swap both entries.

        pop hl
        ld bc,22
        scf:ccf
        sbc hl,bc         ;Move up an entry.
        ld de,table-22    ;Check to see whether
        ld a,h:cp d       ;the top of the table
        jr nz,INSERT      ;has been reached
        ld a,l:cp e       ;and stop if it has.
        jr nz,INSERT

        ret

EXIT    pop hl
        ret

SWAP
;subroutine to swap two entries in table.
;copy first entry into store.
        push hl
        ld de,SWAP_SPACE
        ld bc,22
        ldir
:copy second entry into 1st entry.
        pop hl:push hl
        ld de,22
        add hl,de
        pop de:push hl
        ld bc,22
        ldir
;copy store into second entry.
        pop de
        ld hl,SWAP_SPACE
        ld bc,22
        ldir
        ret
SWAP_SPACE
;Some space used by the swapping
routine.
```

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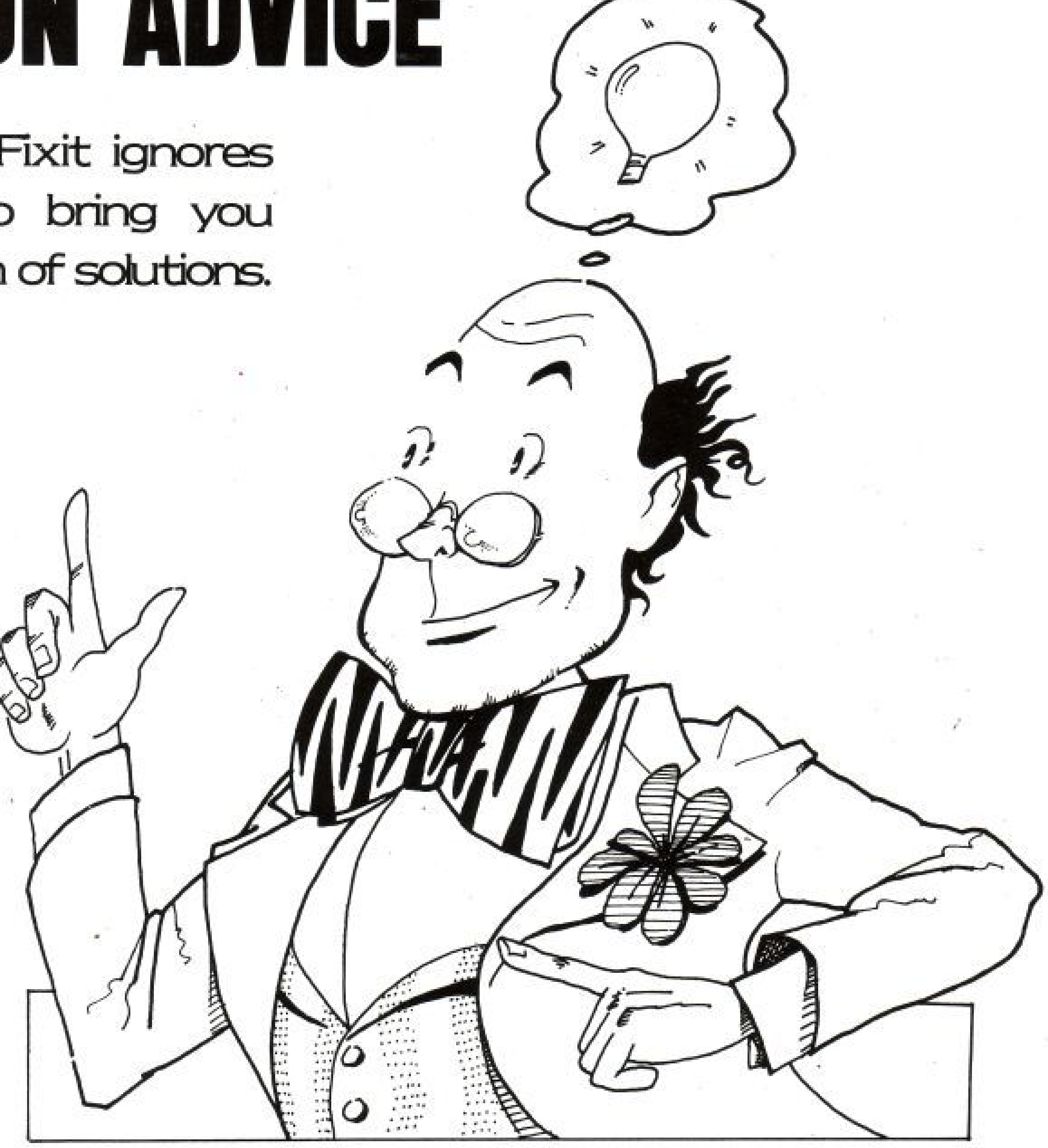
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APPLICATION ADVICE

ACU's very own Mr Fixit ignores the summer heat to bring you another month's worth of solutions.



Don't you love the summer months? The sun is blazing down on my office window, pretty girls are walking about in their summer dresses, and what am I doing? Clacking away on this PC, making telephone calls and being generally miserable – I hate and detest hot weather!

Which is why I am raring to go with this month's batch of applications problems. First out of the bag is from a desperate mum. Mrs. Jean Murphy. She writes: 'Can you help? My son is driving me mad'. 'He has an Amstrad 464 and DMP2160 printer but since he input one of his programs, instead of printing everything in single line spacing, the printer is now printing in double line spacing.

She says that all the DIP switches have been checked, and the whole printer has been checked by a qualified computer engineer and has been given a clean bill of health. I am not surprised, as this is one of the recurring problems recent owners of the CPC range of machines seem to have. The Amstrad printer port is at fault; at least not at fault but the cause of the problem. What is happening is that one of the lines in the standard parallel port – line 14 – is normally either left floating or is held low to tell the printer to perform a line feed. Amstrad implemented a sub-set of the standard Centronics port and decided to keep line 14 held low permanently, as well as making the thing a 7-bit instead of 8-bit affair, – which spawns its own problems – and that is where the problem lies.

The printer has a fuller implementation of the standard, and acts on pin 14 as it should do, which is why you are getting a double line feed instead of the single line feed you are entitled to expect. The solution to the problem is simple. You must isolate the two pin 14s from each other. There are two ways of doing this. The first – and my favorite – is to cut tiny slip of electrical insulating tape, just big enough to fit over one tongue on the computer edge connector. Then you must identify the tongue which corresponds to pin 14 and stick the insulating tape over it. The tricky bit is finding the proper tongue. It is located on the top of the card-edge, and is the fourth one from the left, when you are looking at the back of the machine. To be certain, find the notch in the card-edge, which is four in from one side no matter which way you look at it, and count four tongues in FROM THE OTHER EDGE. That is line 14, and the one to be insulated.

The second way is to cut the line in the printer lead which corresponds to pin 14. It should be the 27th from the red edge of the ribbon but if you are using a fancy rolled ribbon in shielding cable, you have to de-solder at the plug, assuming that it is not a moulded plug at either end. Unfortunately, no matter how many times I give this fix – and it must be hundreds of times now – people still cut the wrong wire, which is why I prefer the insulating tape idea – if it is wrong, it is easily changed, whilst a cut wire is much like Monty Pythons Dead Parrot – it is no more.

Song of Norway

Now, from Norway, where software prices are fit to make you take up fishing, Bjornar Saeternes writes with four questions. First, is it possible to use a dK'Tronics light-

pen with the *Advanced Art Studio*? And the answer is no. Question number two; he has Laser Genius' X-80 assembler and monitor, but has no documentation and wonders if it is available anywhere. The answer is. . .unlikely, I am afraid, unless anyone in ACU land has a spare they wouldn't mind selling.

Question three. Which game with best graphics and music, for the 6128, would I recommend? I do not like to admit it, but I really prefer the more thoughtful type of game on the 6128, such as the Level 9 adventures and Infocom offerings. I keep loading *Savage* though, because I still have not managed to finish it, unlike most of the games for the Arnolds.

Question four. Is it possible to use music composed using the RAM Music Machine in your own programs? That is a little more difficult to answer. I have got to say it depends. If you have been messing about with the Midi capabilities of the machine, you are out of luck, and if you want to use the facilities that the RAM MM provides, which it will obviously have to be present on any CPC which is to run the software. In all probability, the best bet for an application such as this is the Micro Music Creator, which has the most flexible options of which I am aware.

You CAD

From Somerset, Matthew Sach – aged 12 – very important, that – writes to say "I am setting up a Hornby railway in my loft, and I was wondering if there are any CAD packages for the Amstrad which would be suitable to design a track layout". There are some and they are available in the public domain. Because of the limitations of the CP/M screen, – they all run under CP/M – they may not be the most friendly in the world to use. Contact Advantage, a large PD library, or if you have got a modem and suitable software, you might like to dial up one of the bulletin boards local to you, and look through their CP/M sections.

If neither of those two appeal, why not use an art package to do the job? It should be a simple matter to draw out the straights and curves you will need and then, using the rotate and flip options in most of the packages, draw out any number of layouts and even print them out. A CAD package is much more likely to give reasonable results when hooked to a plotter, which might stretch the pocket money a little too far, and 12 is a little young to be getting into the kind of debt to which over-ambitious computer usage leads.

"Here it is, the middle of July, the sun is blazing. . .and what am I doing? Clacking away on this PC."

More BEST BUY printing

Alex Ajao, who by coincidence is also 12 years old, writes to ask whether a printer will fit straight into the back of his CPC464. If he has read this far, he will have seen all he needs to know to answer that questions. As to what is the best printer for a good price, might I suggest that you look in the last two months' *ACUs*, where we have discussed this in some depth. As for availability from the Amstrad User Club. I am assured that it can supply any of the Amstrad range of printers, and perhaps a little cheaper than the list price.

Lost Souls Department

N. Poyner wrote from Guildford, saying "I am trying to find a computer-aided design program for the Amstrad PCW 8512 but have been unable to find one yet. Do you know of any software company produces a CAD system for the PCW?' I can only guide you in the same direction as Matthew Sach, since any of the CP/M programs will run on your machine.

STOP PRESS

Peter Moonen from Belgium sent a letter telling me he had a problem with loading cut-outs into his 464 with 64K RAM expansion and DD1 disc drive. It seems that when he tried to do so, the whole screen scrolled up a few lines, and if I have read correctly, the machine crashed. He has already been in touch with MJC Supplies, which has offered a refund, but he would rather like to sort out the problem and asks whether using the ROMCHANGER featured in the March edition will help.

I feel the problem lies somewhere other than with the software, unless he has a very early version, or somebody has copied *Pagemaker* on to the discs by mistake. I suspect that his RAM expansion pack is the culprit, since in his letter, tells me that he can sometimes load two cut outs, but the third always crashes the machine. That sounds like running out of memory, since cut outs can be of any size. In effect, there is no room in the computer to do the necessary jiggery pokery, so it just gave up.

For the moment, all I can suggest is that he has the RAM pack checked. In the meantime, I will borrow a set up like yours, and see if I can cause the fault you have found to appear.



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